BLUE JAY

December 1987

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Common names are used for species where possible. Bird names follow the 1983 revision of the American Ornithologists' Union Check-list. Mammals are from Banfield's The Mammals of Canada (1974). Since insect and plant names are not standardised, scientific names are included, with authorities where deemed necessary.

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Cover: *Last Mountain Lake. G.W. Beyersbergen*

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BLUE JAY

Vol. 45 No. 4 December 1987 187-280

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SASKATCHEWAN LOTTERIES

HOW WILL WE CELEBRATE THE SECOND WILDLIFE CENTENNIAL?

GEORGE F. LEDINGHAM, 2335 Athol Street, Regina, Saskatchewan. S4T 3G4

Once, about 25 years ago, I was asked, "Why don't we ever see you at the Last Mountain Lake Sanctuary?" I explained that I had been there and I had seen the thousands of ducks, geese and cranes coming back to the lake at dusk. I had even on one occasion stayed overnight and was thrilled as cloud after cloud of wings rose into the presunrise prairie sky to go out to feed in the fields. The sights and sounds were unforgettable. The experience is most impressive when one is alone or sharing it with a few kindred souls. The area belongs to the birds and man must not intrude, at least he must not dominate in any way.

It is fitting that the *Blue Jay*, as the official publication of the Saskatchewan Natural History Society, should devote an issue to the 100th anniversary of the Last Mountain Lake Migratory Bird Sanctuary. For 45 years the *Blue Jay*, through its editors — Isabel Priestly, Clifford Shaw, Lloyd Carmichael and their successors — and its contributors, has spoken for our natural heritage and tried to promote greater understanding and appreciation of it. This year hundreds of people, including many children, visited Last Mountain Lake to celebrate the culmination of 100 years of preservation and to renew our resolve to protect living creatures and to ensure them space to live out their lives.

This area has for thousands of years been a meeting and resting place for hundreds of thousands of birds. When the 77th annual meeting of the American Ornithologists' Union was held in Saskatchewan, a field trip was arranged to share what John A. Livingston describes as "one of the most spectacular natural events of the Canadian year." When James Fisher, the British ornithologist, watched the effortless wheeling of hundreds of Sandhill Cranes overhead, he said: "this alone was worth coming 4,500 miles to see." (Reports on the AOU meeting can be reread in the December 1959 issue of the *Blue Jay*.)

It is easy to look back at man's understanding and appreciation of nature. In this centennial year we should all review the problems of the past and help to plan for the second hundred years. In 1966, Lucy Murray wrote an article for the *Blue Jay* entitled "Bird sanctuaries in Saskatchewan 1887-1965" which is well worth reading. In 1930 there were 14 bird sanctuaries containing 476,038 acres (66,156 land, the rest water). In 1956 there were 15 sanctuaries but they covered only 38% of the water area and 6% of the land protected in 1930. Before 1930 there were 12 public shooting grounds but these were abolished in 1951 after pressure from agricultural interests. In 1930 the Natural Resources Transfer Agreement between the Federal Government and the Province of Saskatchewan was completed. By this agreement the province was not only to continue preserving bird sanctuaries and shooting grounds but to create additional ones.

Obviously, in Saskatchewan, sanctuaries have had their problems, the most recent being Redberry Lake. Not only were the sanctuaries open for hunting during legal shooting seasons in the early years, but the total needs of the birds have usually been poorly met since most sanctuaries include only water. This problem will persist as long as agriculture departments emphasize production per farmer rather than the value of good land and its

long-term productivity. Farms are still getting larger and no land, no matter how marginal or how close to the water's edge, is safe from cultivation. Crop depredation is the term applied when birds or other wildlife feed on man's crops; the usual result of serious conflicts is that nature is brushed aside.

Other articles in this issue of *Blue Jay* describe the rededication of the Last Mountain Lake Bird Sanctuary, and various aspects of nature in the area. It was the abundance of birds which brought the area to the attention of Canada 100 years ago. Now the feeding and nesting needs of the birds are being considered and the future of the sanctuary is guaranteed for the next century. The articles make it clear that the area is important not just because of the water birds, but because of all the native plants and animals. Hopefully, ever-increasing numbers of people will be able to come to this sanctuary to gain a window into the lives of birds and other life forms. In this way the area can become an ever greater asset to man, but the activities of man in the area must be carefully controlled.

One cannot predict the future, but in the last 75 years the number of people on earth has increased nearly four times. This fact gives one cause to worry, but there are some hopeful signs. Man now recognizes that the resources of this earth, including space, are finite. It is also recognized that man shares this earth with other species and is dependent on them. Man will continue to use natural resources, but must use them in sustainable ways.

In June 1972 the United Nations organized its first global conference to examine the earth's environmental problems. Canadians presented briefs and sent a delegation to that conference in Sweden. Since then Canada has hosted a conference of environmentalists from around the world and has endorsed the World Conservation Strategy. The three objectives of this Strategy are:

to maintain essential ecological processes;

to preserve genetic diversity including, wherever possible, the prevention of extinction of any species of plant or animal;

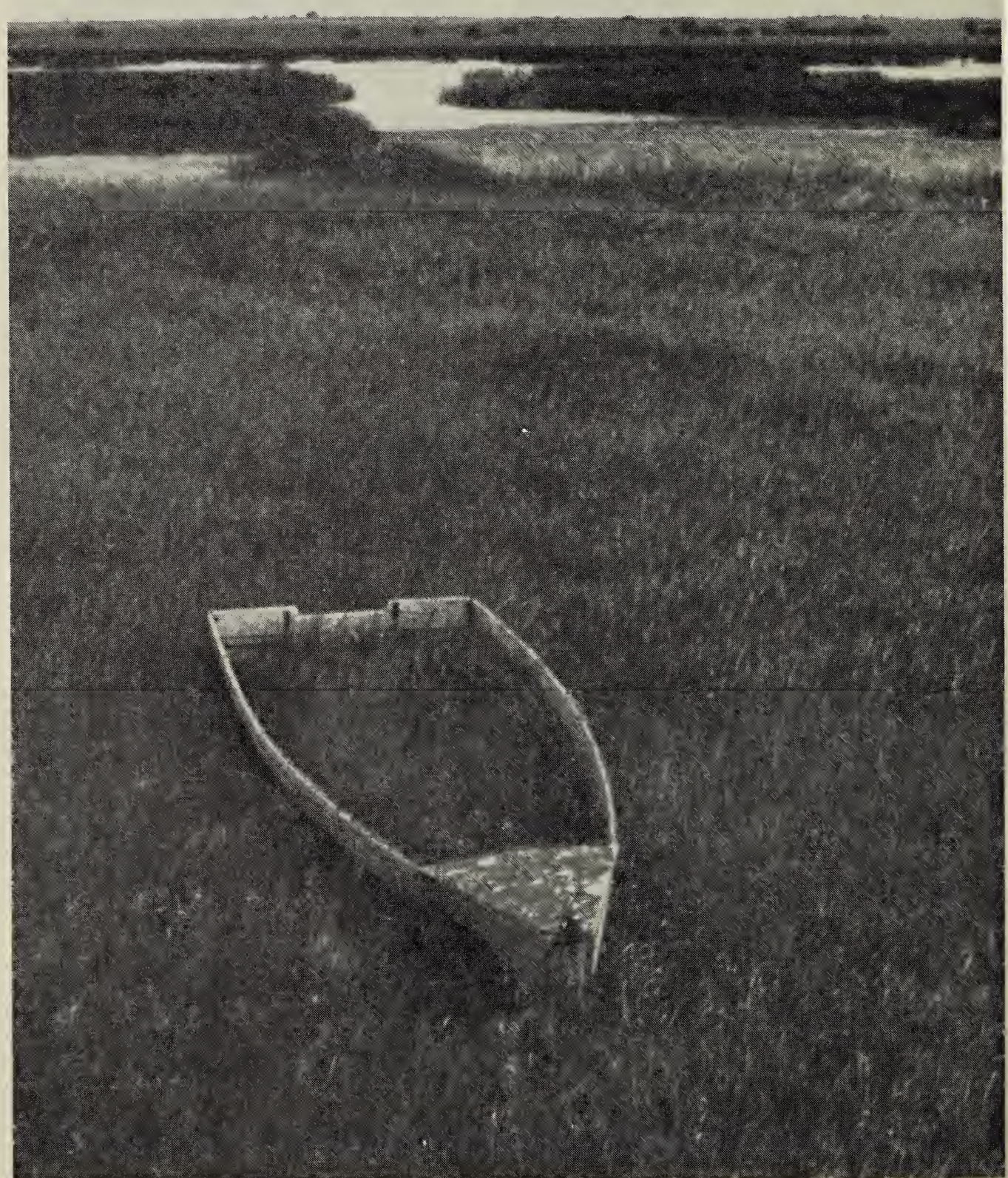
and thirdly, to ensure sustainable utilization of species and ecosystems.

Our governments, though frequently influenced by the urgency of winning an election, do try to think of the long-term good of the country and its people.

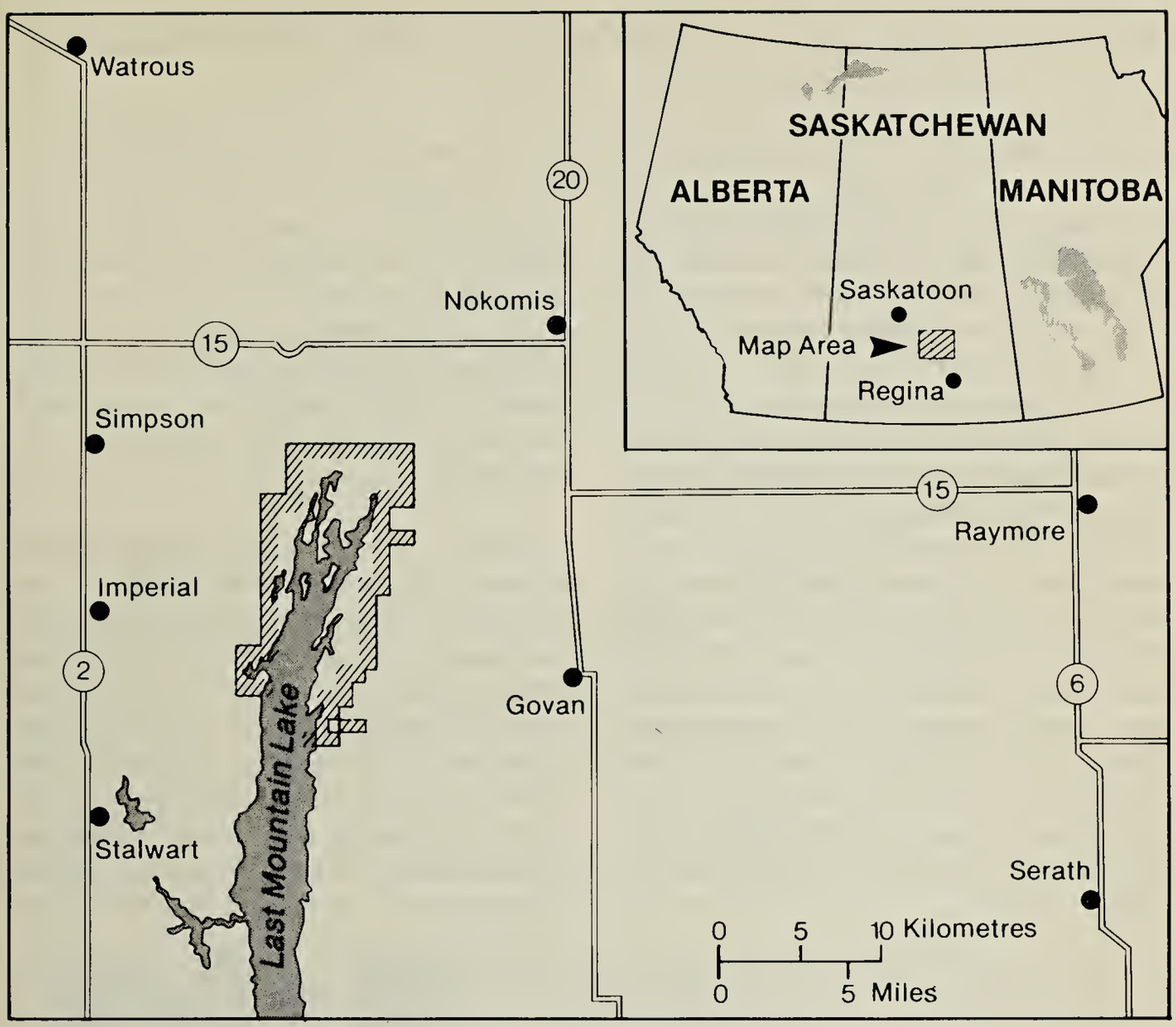
Governments, like humans, lack perfection and though the World Conservation Strategy was endorsed there has been little in the way of action towards meeting the objectives. The next 100 years may still be difficult for sanctuaries in Saskatchewan. All who have concerns for nature must resolve to work harder in the future. We have 100 years of experience to work from. We must cherish the gains made and work to preserve other habitats and ecosystems so that all species of plants and animals will have the chance for a future. The Whooping Crane was brought back from the very brink of extinction and the Last Mountain Lake Refuge is part of the habitat that is needed for its continued survival. Negotiations for an agreement which will protect some of our driest areas in a National Grasslands Park were not completed in the first 100 years; efforts toward that end cannot be relaxed while we search out other areas requiring preservation.

We cannot all be active in conservation but we can all support natural history societies (local, provincial and national) or wildlife, park, wilderness or other conservation groups. We can urge our friends to be interested in nature and supportive of its needs. Do you know areas which should be protected or which could

possibly become an ecological reserve? Write to us about it. Help us to protect the Last Mountain Lake area and extend the same protection to other areas of remaining natural habitats.



Last Mountain Lake *P.S. Taylor*



Last Mountain Lake National Wildlife Area, Saskatchewan

For further information and to report observations contact the following:

Area Manager
Canadian Wildlife Service
Box 280
Simpson, Sask.
S0G 4M0

or

Habitat Biologist
Canadian Wildlife Service
115 Perimeter Road
Saskatoon, Sask.
S7N 0X4

WILDLIFE '87: GAINING MOMENTUM

P.S. TAYLOR, 1714 Prince of Wales Avenue, Saskatoon, Saskatchewan. S7K 3E5

Environment Minister Tom McMillan designated 1987 "a year of wildlife conservation in Canada." It was to mark 100 years since the establishment, by Sir John A. MacDonald on 8 June 1887, of the first bird sanctuary in Canada at Last Mountain Lake, Saskatchewan. Although the idea of dedicating the year to wildlife was endorsed by provincial and territorial wildlife ministers, it was the non-government conservation groups which took the initiative and played a lead role in making "*Wildlife '87*" a success. The Canadian Nature Federation coordinated and communicated with participating groups across Canada. In February 1986, a national committee chaired by Joy Finlay of Edmonton began to bring attention to the many conservation efforts planned for 1987.

Wildlife '87 aims were to recognize the importance of wildlife conservation in Canada, to increase public awareness of our wildlife heritage, to establish new conservation projects, to protect and set aside important wild areas and to involve people young and old in conservation projects.

Wildlife '87 Newsletters recorded the events. Two new naturalist clubs were formed in New Brunswick in January. Symposia on Bear-People Conflicts, Northern Forest Owls, the Fraser River Estuary, Canada's Wetlands Ecology and Conservation, and Workshops on Bird Banding, and Urban Natural Areas were held. Bald Eagle and Peregrine Falcon release projects were undertaken. The Boy Scouts were awarded the World Conser-

Award presentation to Wildlife '87 Chairperson Joy Finlay by Prince Philip
Bob Lane

vation Badge. Newfoundland voted for Black Spruce and the Puffin as their provincial tree and bird and British Columbia selected the Steller's Jay as their provincial bird. There were Owl Howls, Bird Fairs, Decoy Carving Competitions, Birdathons, Amphibian Hunts, Slide Competitions, and Park Weekends. Hamilton, Ontario hosted the Coote's Paradise Wildlife Festival. Several books were published including the *Ontario Breeding Bird Atlas*, a *Wildlife '87 Teacher's Manual* and *Our Wildlife Heritage - a century of use and management in B.C.*

The first Wildlife Reserve protected under the *Wildlife '87* Program was 64 hectares of aspen parkland east of Edmonton. This was soon followed by seven new Ecological Reserves in Alberta and six Wilderness Areas in British Columbia. Nova Scotia published its first Wildlife Policy and tabled a new Wildlife Act. New Brunswick designated a Nature Reserve protecting the habitat of 17 species of orchids. The Canadian commitment to the Ramsar Convention was increased by listing 11 new wetlands of International Importance.

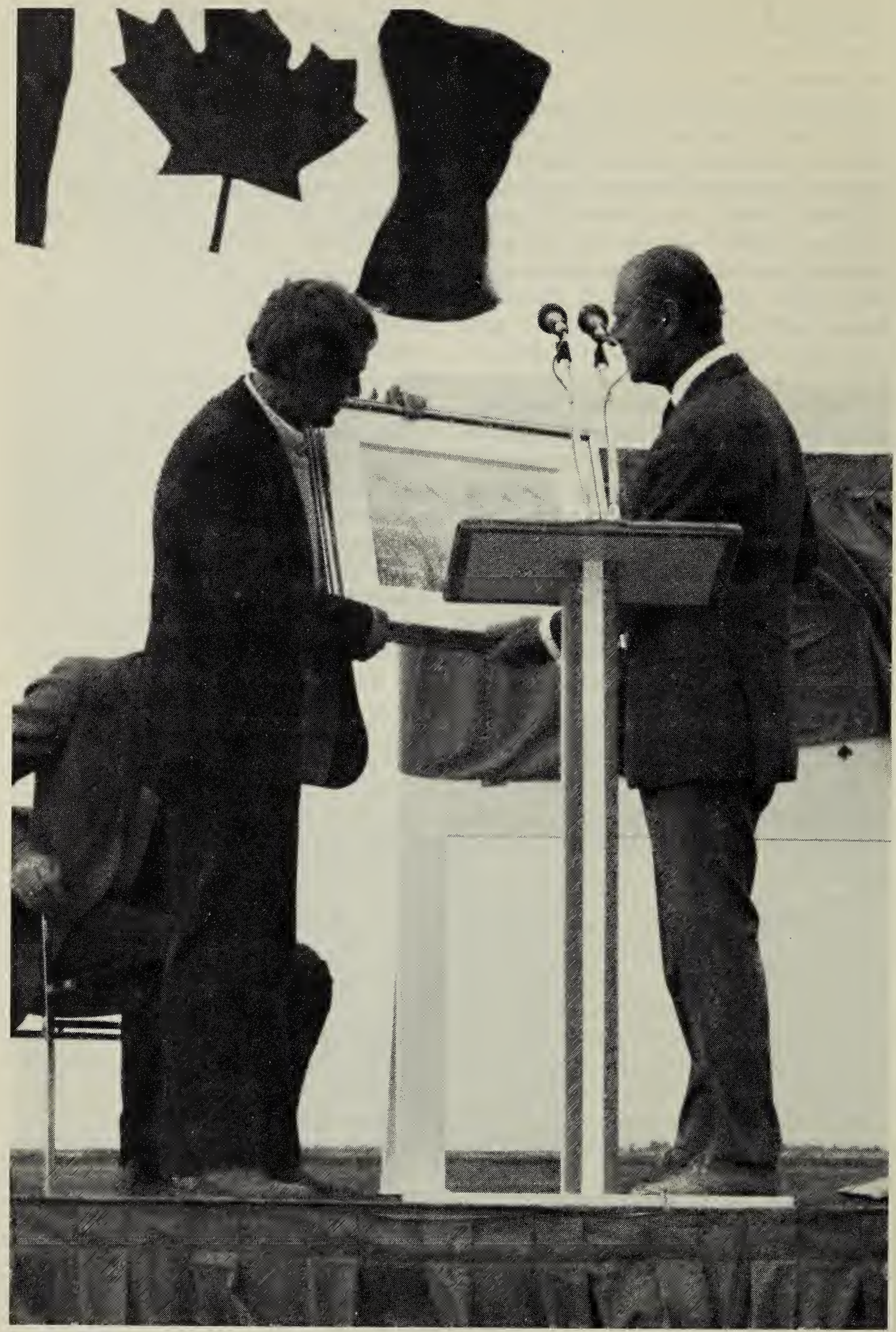
These are a few examples from over 160 projects listed in the *Wildlife '87* National Calendar of Events by 10 May 1987.

In July two new National Parks agreements were signed — one for Lyell Island and part of southern Queen Charlotte Islands, British Columbia, the second for part of the Bruce Peninsula, Ontario. During the Parks Canada centennial year, 1985, not one new park was established! In the fall of 1986 Environment Minister McMillan had announced terms for establishing the Ellesmere Island Park reserve and declared Polar Bear Pass on Bathurst Island, N.W.T., as a National Wildlife Area.

Saskatchewan hosted several national and international conferences in 1987. At the Ramsar Conference in Regina were delegates from 60 nations. The 16th Annual Canadian Nature Federation meeting was held in Saskatoon. In the fall were the annual meetings of the Canadian Parks and Wilderness Society and the Whooping Crane Conservation Association. Delegates from all these meetings visited Last Mountain Lake. Finally, the Second International Muskox Symposium was held in Saskatoon in October.

At Last Mountain Lake a number of projects were completed by the Canadian Wildlife Service and cooperators for improved wildlife management and public information. In cooperation with Ducks Unlimited Canada, two dykes were constructed on Lanigan Creek, at the north end of the main Basin. This will provide permanent, extensive shallow marsh and wet meadow habitats in areas which were formerly flooded only in years of very high water levels. West of the lake a large electric pump was installed to provide water to an alkali basin which in recent years has often been dry. Both projects will manage water to provide marsh habitat for waterfowl, cranes, shorebirds and other wildlife.

A Public Information Centre was completed adjacent to the headquarters at the lake. In this kiosk are displays on the history, wildlife, habitats and management programs of the area and information on Last Mountain Lake including a bird checklist. An Auto Tape Tour, recently revised, is available from the Area Manager. It takes one to several hours to drive the 14 km loop to view wildlife and conservation programs while listening to the tape recorded messages. There are also two self-guided nature trails, the Grassland Trail featuring a buffalo rubbing stone, and the Wetland Trail with a marsh boardwalk. An observation tower is now located 1 km east of the Information Centre. From this tower the spectacular sight of thousands of geese, cranes, ducks and other birds moving on an autumn evening between feeding and roosting areas



Presentation to Prince Philip of Robert Bateman painting of pelicans at Last Mountain Lake
Bob Lane

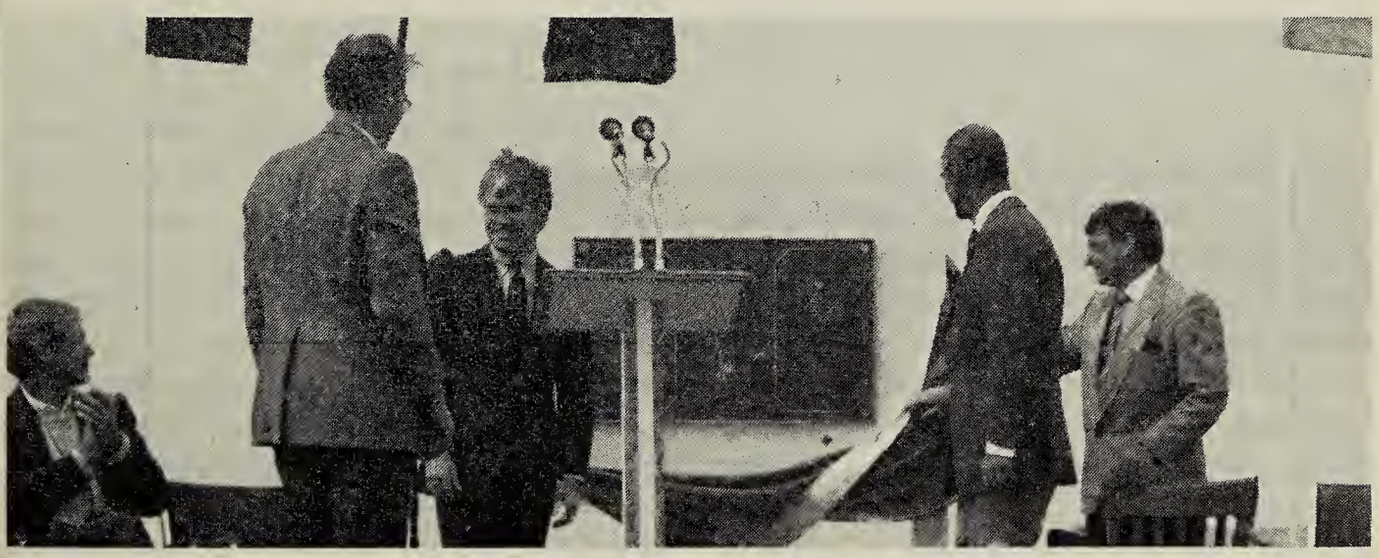
Signing the agreement for Last Mountain Lake National Wildlife Area Bob Lane

provides an insight into the importance of Last Mountain Lake as a staging area for migrating birds.

A Centennial Display on Last Mountain Lake was developed by the Canadian Wildlife Service in conjunction with the J.G. Diefenbaker Centre (University of Saskatchewan, Saskatoon). This display depicts wildlife conservation at local, national and international levels and is filled with photos and historic information. The tour of Saskatchewan centres by this travelling centennial display will continue into 1988.

An historic day for Last Mountain Lake was 5 June 1987. An Agreement between Canada and Saskatchewan was signed to establish Last Mountain Lake as a National Wildlife Area, nearly 100 years after the site was first designated a sanctuary. After the signing a centennial plaque showing the original sanctuary lands was unveiled. His Royal Highness, The Prince Philip witnessed and gave his approval to the agreement drawing attention to wildlife conservation in Canada. An Environment Canada award was presented to Joy Finlay for her dedicated work for *Wildlife '87*, and a painting of "White Pelicans at Last Mountain Lake" by Robert Bateman was given to Prince Philip. Proceeds from a limited edition of prints of the painting will go toward World Wildlife Fund conservation programs.

What has beem accomplished by *Wildlife '87*? Although those who have struggled long towards establishment of a Grasslands National Park were deeply disappointed to see no final agreement between Saskatchewan and Canada, many other conservation projects were successfully completed. Most important of all, the need to work together for conservation became even more apparent as a result of this year. The *Gaining Momentum* theme, suggesting that the work of wildlife conservation has just begun and will go on beyond 1987, was well chosen.



Plaque commemorating creation of the Last Mountain Lake National Wildlife Area Bob Lane

CANADA'S COMMITMENT TO THE "RAMSAR" CONVENTION

BERT POSTON, Canadian Wildlife Service, Environment Canada, Room 230, 4999-98 Avenue, Edmonton, Alberta, T6B 2X3 and COLLEEN HYSLOP, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario. K1A 0E7

Since references to "Ramsar" wetlands are encountered periodically, an explanation of the term is needed. Ramsar is the city in Iran in which in 1971 the "Convention on Wetlands of International Importance especially as Waterfowl Habitat" (also known as the Ramsar Convention) was first drafted by 18 countries. By creating an international mechanism for the protection of wetlands, these countries demonstrated their commitment to the conservation, management and wise use of these environments, their fauna and flora.

Since 1971 there have been three conferences of the "Parties to the Ramsar Convention" - in Cagliari, Italy (1980), in Groningen, the Netherlands (1984) and in Regina, Canada from 27 May to 5 June 1987. These meetings are held for the purpose of discussing the implementation of the Convention and exchanging worldwide information on wetland conservation issues. Currently, 45 countries have acceded to the Convention (Table 1) and the List of Wetlands of International Importance (referred to as "The List") now includes 381 sites.

Two international organizations which have been instrumental in supporting the development and implementation of the Ramsar Convention are the International Union for the Conservation of Nature and Natural Resources (IUCN) and the International Waterfowl and Wetlands Research Bureau (IWRB). At the Regina Conference these organizations were asked to provide a permanent secretariat for the Convention, the "Convention Bureau," consisting of an administrative unit based at IUCN Headquarters in Gland, Switzerland, and a unit to provide technical and scientific advisory services based at IWRB Headquarters in Slimbridge, England. The Bureau carries out the work of the Parties, such as keeping track of The List of wetlands and changes to it, encouraging countries to join the Convention, arranging for studies to be done on important wetland issues, and arranging for meetings of the Parties.

Canada acceded to the Ramsar Convention in 1981 and designated Cap Tourmente National Wildlife Area, Quebec, as Canada's first Ramsar wetland. Fourteen more wetlands were added in 1982, 2 in 1985, and 11 new sites were announced at the 1987 conference for a total of 28 (Table 2, Fig. 1). The area of Canada's Ramsar sites is about 50% of the total area world-wide, including the two largest sites — Whooping Crane Summer Range (1,689,500 ha) in Alberta and Northwest Territories (N.W.T.) and Queen Maud Gulf Migratory Bird Sanctuary in N.W.T. (6,200,000 ha).

Canada has designated most of its largest sites in the north; for example, above the Arctic Circle Canada's four Ramsar sites comprise 85% of the total area of Ramsar wetlands listed north of 66°N latitude. The remaining 15% is in Sweden, Finland and Norway. Some of Canada's northern sites are large areas with low overall biological productivity and density of birds, whereas others, such as Polar Bear Pass, N.W.T., are recognized as unique biological oases.

Table 1. PARTIES TO THE RAMSAR CONVENTION AS OF JUNE 1987

Country	*Date*	*Number of Sites*	*Area (ha)*
Algeria	Nov. 83	2	8,400
Australia	May 74	27	1,294,090
Austria	Dec. 82	5	102,369
Belgium	Mar. 86	6	7,635
Bulgaria	Sep. 75	4	2,097
Canada	Jan. 81	28	12,886,336
Chile	Jul. 81	1	4,877
Denmark	Sep. 77	27	734,202
Finland	May 74	11	101,343
France	Oct. 86	1	85,000
Gabon	Dec. 86	3	1,080,000
German Democratic Republic	Jul. 78	8	46,787
Germany, Federal Republic of	Feb. 76	20	313,600
Greece	Aug. 75	11	80,500
Hungary	Apr. 79	8	29,450
Iceland	Dec. 77	1	20,000
India	Oct. 81	2	119,373
Iran	Jun. 75	18	1,297,550
Ireland	Nov. 84	8	6,516
Italy	Dec. 76	40	51,476
Japan	Jun. 80	2	5,571
Jordan	Jan. 77	1	7,372
Mali	May 87	3	?
Mauritania	Oct. 82	1	1,173,000
Mexico	Jul. 86	1	47,480
Morocco	Jun. 80	4	10,580
Netherlands	May 80	14	301,185
New Zealand	Aug. 76	2	14,944
Niger	Apr. 87	1	220,000
Norway	Jul. 74	14	16,256
Pakistan	Jul. 76	9	20,990
Poland	Nov. 77	5	7,090
Portugal	Nov. 80	2	30,563
Senegal	Jul. 77	4	99,750
South Africa	Mar. 75	6	202,044
Spain	May 82	3	52,392
Suriname	May 85	1	12,000
Sweden	Dec. 74	20	271,075
Switzerland	Jan. 76	2	1,816
Tunisia	Nov. 80	1	12,600
United Kingdom	Jan. 76	31	91,202
U.S.A.	Dec. 86	8	945,142
U.S.S.R. (Russia)	Oct. 76	12	2,987,185
Uruguay	May 84	1	200,000
Yugoslavia	Mar. 77	2	18,094
45 Parties		381	25,019,932 +

Muskox bull at Polar Bear Pass National Wildlife Area - Ramsar site *P.S. Taylor*

Table 2. RAMSAR SITES IN CANADA, 1987

Year	*Site*	*Area (ha)*	*Status**	*Owner***
1981	Cap Tourmente, PQ	2,200	NWA	F
1982	Mary's Point Unit, Shepody NWA, NB	1,200	NWA	F Pr nd
1982	Long Point, ON	13,730	NWA	F P Pr
1982	Delta Marsh, MA	23,000	-	P
1982	Last Mountain Lake, SK	15,600	MBS,NWA	F P
1982	Peace-Athabasca Delta, AB	321,300	NP	F
1982	Hay-Zama Lakes, AB	50,000	-	P
1982	Alaksen, BC	520	MBS,NWA	F
1982	Old Crow Flats, YT	617,000	-	F
1982	Whooping Crane Summer Range, AB-NWT	1,689,500	NP	F
1982	McConnell River, NWT	32,800	MBS	F
1982	Queen Maud Gulf, NWT	6,200,000	MBS	F
1982	Rasmussen Lowlands, NWT	300,000	-	F
1982	Dewey Soper, NWT	815,900	MBS	F
1982	Polar Bear Pass, NWT	262,400	NWA	F
1985	Chignecto, NS	1,020	NWA	F
1985	St. Clair, ON	240	NWA	F
1987	Grand Codroy Estuary, NF	925	-	P
1987	Musquodoboit Harbour Outer Estuary,NS	1,925	-	P
1987	Shepody Bay, NB	12,000	-	P
1987	Baie de l'Isle Verte, PQ	1,930	NWA	F P
1987	Lac Saint-Francois, PQ	2,210	NWA	F nd
1987	Polar Bear Provincial Park, ON	2,408,700	-	P
1987	Southern James Bay, ON	25,290	MBS	P
1987	Point Pelee, ON		1,560	NP F
1987	Oak-Hammock Marsh Wildlife Area, MA	3,600	-	P
1987	Quill Lakes, SK	63,500	-	P
1987	Beaverhill Lake, AB	18,050	-	P
	TOTAL 28 sites	12,886,100		

* Federal Legal Status: NWA - National Wildlife Area, MBS - Migratory Bird Sanctuary, NP - National Park

** Land Owner: F - Federal, P- Provincial, Pr - Private, nd - not deeded

1 Mary's Point NWA (N.B.)
2 Chignecto NWA (N.S.)
3 Cap Tourmente NWA (Que.)
4 Long Point NWA (Ont.)
5 St. Clair NWA (Ont.)
6 Delta Marsh (Man.)
7 Last Mountain Lake MBS, NWA (Sask.)
8 Peace-Athabasca Delta NP (Alta.)
9 Hay-Zama Lakes (Alta.)
10 Alaksen MBS, NWA (B.C.)
11 Old Crow Flats (Yukon)
12 Whooping Crane Summer Range NP (Alta.-N.W.T.)
13 Queen Maude Gulf MBS (N.W.T.)
14 Rasmussen Lowlands (N.W.T.)
15 Polar Bear Pass NWA (N.W.T.)
16 Dewey Soper MBS (N.W.T.)
17 McConnell River MBS (N.W.T.)
18 Grand Codroy Estuary (Nfld.)
19 Musquodoboit Harbour Outer Estuary (N.S.)
20 Shepody Bay (N.B.)
21 Baie de l'Isle Verte NWA (Que.)
22 Lac Saint-Francois NWA (Que.)
23 Point Pelee NP (Ont.)
24 Southern James Bay MBS (Ont.)
25 Polar Bear Provincial Park (Ont.)
26 Oak-Hammock Marsh Wildlife Area (Man.)
27 Quill Lakes (Sask.)
28 Beaverhill Lake (Alta.)

Figure 1. Ramsar sites in Canada.

The Canadian Wildlife Service (C.W.S.) is the federal agency responsible for implementation of the Convention in Canada and cooperates with other federal agencies and the provincial and territorial governments to identify, list and ensure the adequate protection of important wetlands. Although virtually all lands included to date are crown-owned, unless additional measures for protection are entrenched, the politics of the day could influence their ultimate disposition or use. Fortunately, Ramsar wetlands in Canada may receive additional protection under some of the following legislation: the Migratory Birds Convention Act and Migratory Bird Sanctuary Regulations; the Canada Wildlife Act and Wildlife Area Regulations; the National Parks Act and Regulations; and, where appropriate, provincial and territorial acts and regulations.

Countries joining the Ramsar Convention have an obligation to designate at least one wetland to be included in The List. To date, a wide range of freshwater and marine habitats have been selected, including estuaries, salt marshes, mangrove swamps and coral reefs. Several examples include: the Netherlands Wadden Sea; Suriname's Coppename Rivermouth Nature Reserve; and Australia's East Coast Cape Barren Island Lagoons. Sites are selected because of their significance to waterfowl (birds ecologically dependent on wetlands) and because of their international importance in terms of ecology, botany, zoology, limnology or hydrology.

The 1987 Conference recommended that one or more of the following criteria be used in identifying sites to be added to The List:

1) The wetland is a particularly good example of a specific type of wetland characteristic of its region, be it a rare

Long Point National Wildlife Area - Ramsar site *P.S. Taylor*

or common type (e.g. Long Point, Ontario)

2) The wetland supports plants or animals that are rare, vulnerable or endangered; is important in maintaining the genetic and ecological diversity of a region; is a habitat important to species at a critical stage of their life cycle; or is of special value to endemic species or communities (e.g. Whooping Crane Breeding Area, Alberta-N.W.T.)

3) The wetland regularly supports 20 thousand waterfowl (e.g. loons, grebes, pelicans, storks, ibises, spoonbills, herons, flamingoes, swans, geese, ducks, cranes, rails, coots, shorebirds, gulls, terns); regularly supports 1% of a waterfowl population; or supports substantial numbers of waterfowl indicative of wetland values, productivity or diversity (e.g. Last Mountain Lake, Saskatchewan)

These criteria will be reviewed before the next Ramsar Conference, to be held in Switzerland in 1990, to examine ways in which they might be expanded to make the Convention more relevant to the concerns of developing countries. These countries need to emphasize the importance of wetlands in economic, social and cultural terms — as well as for the conservation of nature — in order to develop both public and government support for wetland protection.

Notwithstanding Canada's historical interest in wetland conservation, the commitment to Ramsar was a major step forward. Wetlands designated under the Convention gain international recognition which strengthens the case for their protection. Parties to the Convention are also committed to the wise use of all wetlands in their territory. Canada, with the longest coastline of any country and 15% of the world's fresh water, has an immense natural heritage to conserve.

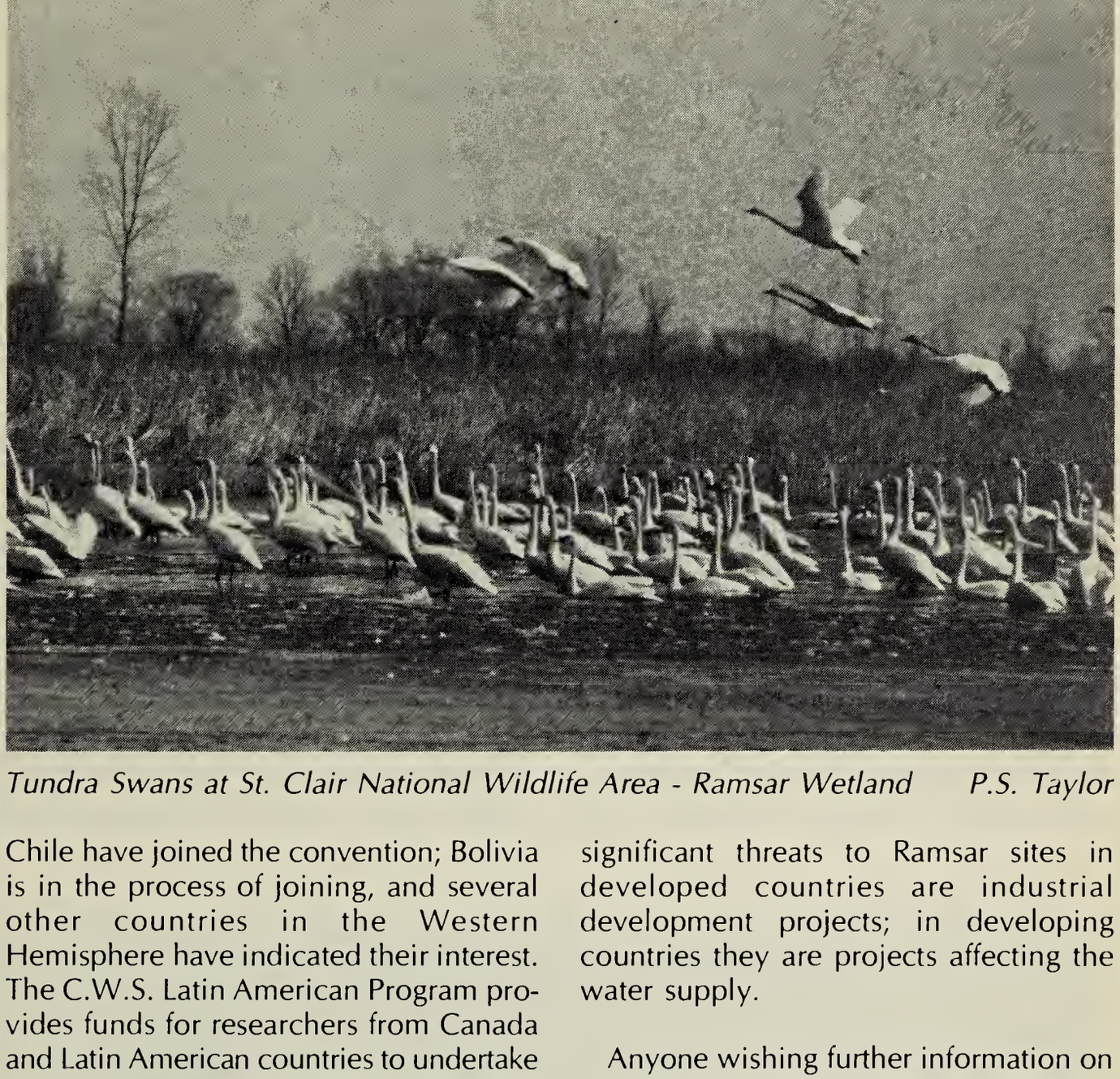
In designated areas change is not prevented, but potential hazards and developments are examined thoroughly and possible remedies are fully explored and properly designed before, rather than after a change. One notable Canadian example is Mary's Point, a Ramsar site at the upper end of the Bay of Fundy in New Brunswick. This area is potentially liable to massive change by a projected tidal power scheme. It is managed under the Canada Wildlife Act as part of a National Wildlife Area. Its designation as a Ramsar Wetland means that Canada has an international commitment to ensure that plans are formulated and implemented to promote its conservation. Although including a wetland on The List does not give it additional legal protection, it exerts a strong moral influence on Parties to comply with the spirit of the Convention.

At the 1987 conference in Regina the following definition of "*wise use*" was put forward:

> "The wise use of wetlands is their sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem."

The "wise use" provision of the Convention recognizes that wetlands are valuable for socio-economic and cultural reasons as well as for the conservation of nature. It commits Parties to make use of their wetland resources in ways that maintain their potential to meet the needs and aspirations of future generations in all respects.

Canada also has an interest in the wetland habitats used by its populations of migratory waterfowl outside of the breeding season. Many of Canada's waterbirds winter in the southern U.S.A. or in Latin America. Accordingly, Canada is eager to promote adherence to the Convention among these countries. The U.S.A., Mexico, Suriname, Uruguay and



Tundra Swans at St. Clair National Wildlife Area - Ramsar Wetland P.S. Taylor

Chile have joined the convention; Bolivia is in the process of joining, and several other countries in the Western Hemisphere have indicated their interest. The C.W.S. Latin American Program provides funds for researchers from Canada and Latin American countries to undertake surveys and studies in order to promote the conservation of migratory birds and their habitats in Latin America.

Although parties to the Ramsar Convention are able to delete wetlands from The List for reasons of urgent national interest, no country has yet done so. However, there have been deletions of parts of sites and there are indications that a number may sustain considerable change in their ecological character in the near future. When parts of sites are deleted parties have a commitment to compensate for the loss as far as possible and to create additional reserves to protect an adequate portion of the original habitat. The most significant threats to Ramsar sites in developed countries are industrial development projects; in developing countries they are projects affecting the water supply.

Anyone wishing further information on Canada's involvement with the Ramsar Convention should contact the Canadian Wildlife Service, Environment Canada, Ottawa. K1A 0E7

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A REFUGE FOR WILDLIFE

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One hundred years ago, on 8 June 1887, the Government of Canada created the first bird sanctuary in North America by reserving the islands and shores at the north end of Last Mountain Lake, Saskatchewan, as breeding grounds for wildfowl. Wildlife abundance in the area was recognized by the government. In the lake's rich history wildlife often played a major role in drawing people. Native people, fur traders, explorers, government officials, land companies and farmers all have their place in the story of the lake. The establishment of the bird sanctuary was only the beginning of a long struggle to develop wildlife protection in Canada, the achievement of which we can all be proud as we celebrate the centennial of the Last Mountain Lake Bird Sanctuary.

Indians people, buffalo and the fur trade

When Henry Kelsey crossed the western plains in 1690, the native peoples there were still living a nomadic life. They followed herds of buffalo which provided them with food, shelter, clothing, tools and weapons. Every summer they waged war on other tribes to the south.[3] By the mid-1700s the fur trade was expanding rapidly into the interior, pushed by competition between trading companies and the near depletion of furs in the east. Company employees, such as Anthony Henday of the Hudson's Bay Company, were sent to the prairies to persuade the tribes to bring their furs to the large fortified forts on the rim of Hudson Bay. Many Assiniboine and Cree Indians soon became dependent on the fur trading companies

An Indian camp *Saskatchewan Archives Board*

for a supply of European goods, and many became the middle men between the English traders on the Bay and the Blackfoot tribes further west.[11] The Indian lifestyle had begun a rapid change.

Traders from the Montreal-centered North West Company travelled west to trade directly with the Plains Indians. One such trader was David Harmon who established trading relations with the Indians on the east side of Last Mountain Lake in 1804. Harmon noted that the natives called it "Great Devil's Lake."[8] To compete with the North West Company's direct trade, the Hudson's Bay Company opened trading posts on the plains. The Fort Touchwood Hills Post (1849 to 1909) was strategically located on the Carlton trail, an important transportation route.

Henry Youle Hind, a University of Toronto professor, was sent on an exploring expedition to the area in 1858 as a result of increasing government interest in the settlement of the plains. Hind visited the Touchwood Post and noted the new importance of Last Mountain Lake:

> "The Plain Crees are not fishermen . . . they did not know how to catch fish when the attention of the people at the Touchwood Hills Fort was first directed to the treasures of Last Mountain Lake . . . [they] first observed the whitefish under the ice in November of 1854, and since that time they have established a fishery which provides the fort with an ample supply for winter consumption."[7]

Hind also mapped Last Mountain Lake and described the landforms surrounding it, including "Last Mountain," the hills 16 km east, which were a landmark for early traders.

Although Fort Qu'Appelle (established in 1852) became an important fur trade centre, the Assiniboine, Cree, Sioux and Metis also visited wintering posts such as Last Mountain House, which was

Cree family *Saskatchewan Archives Board*

established on the east shore of Last Mountain Lake (across from Lumsden Beach) in 1869. A year later the Hudson's Bay Company sold "Rupert's Land" to the new Dominion of Canada. Company officials did not stop operating although long term prospects looked grim. The first year's trade at Last Mountain House showed good profit, with many Indians trading pemmican, furs and leather for weapons and utensils. In the next few years Metis free traders and American whiskey traders took away much of the post's business.

The deciding factor in the fate of Last Mountain House, and many similar trading posts, was the great decline of the buffalo. Isaac Cowie, a clerk at the post 1869-70, reported one of the last large herds of buffalo at the north end of the lake: "They blackened the whole country, the compact; moving masses covering it so that not a glimpse of green grass could be seen the earth trembled, day and night, as they moved in billow-like battalions over the undulations of the plain."[2] The lucrative trade in hides caused Indians, Metis and white hunters to kill off the animals with devastating efficiency. In 1870 Cowie recorded that only 50 bags of pemmican had been brought to Last Mountain House and fewer to Fort Qu'Appelle.[2] There was insufficient business to keep the Last Mountain Lake post open. The fur trade was breaking down. By the end of the century all that was left of the buffalo was their sun-bleached bones and soon they, too, were harvested. Metis and settlers began in 1881 to burn the vegetation to expose the bones for picking. In 1884 the first loads of buffalo bones were sent from Regina to the mills of the central United States, where they were ground into fertilizer. Prices ranged from $5.50 to $8.00 per ton; hundreds of thousands of buffalo skeletons were collected by the end of the century.[5]

A new era was beginning on the prairies. The Canadian government continued nation building, and began plans

Running bison *Local History Room, Saskatoon Public Library*

Piled bison bones *Local History Room, Saskatoon Public Library*

to settle the west. In 1872 the Dominion Lands Act was passed, which dealt with the sale of crown lands, and a system for the survey of townships, school lands, railway grants and land for free homestead.[6] The most crucial step towards peaceful settlement and agricultural development was the surrender of Indian title to land. In September 1874, Treaty [4] with the Cree and Salteaux Indians, included those of the Qu'Appelle-Touchwood area. Negotiations were difficult, but due to the precarious position that the Indians were in, with the buffalo nearing extinction, and with poverty, sickness and starvation on the rise, there was little alternative for the native people except to agree to the terms of the government in return for protection and assistance. The North West Mounted Police force (created in 1873) began working to confine the natives to their new reserves.[11] Government agents were sent to teach farming methods to the Indians. The nomadic way of life was gone forever.

Last bison shot in the prairies
Saskatchewan Archives Board

It had only taken 200 years from the appearance of the European on the plains "for man to emerge as an ecological dominant and for the European economic system to effect major changes in an ecosystem that apparently had been in a relatively steady state for thousands of years".[11] Already the buffalo had vanished. How would the coming of settlement and agriculture affect the wildlife of

Survey party near Last Mountain Lake *Saskatchewan Archives Board*

Last Mountain Lake?

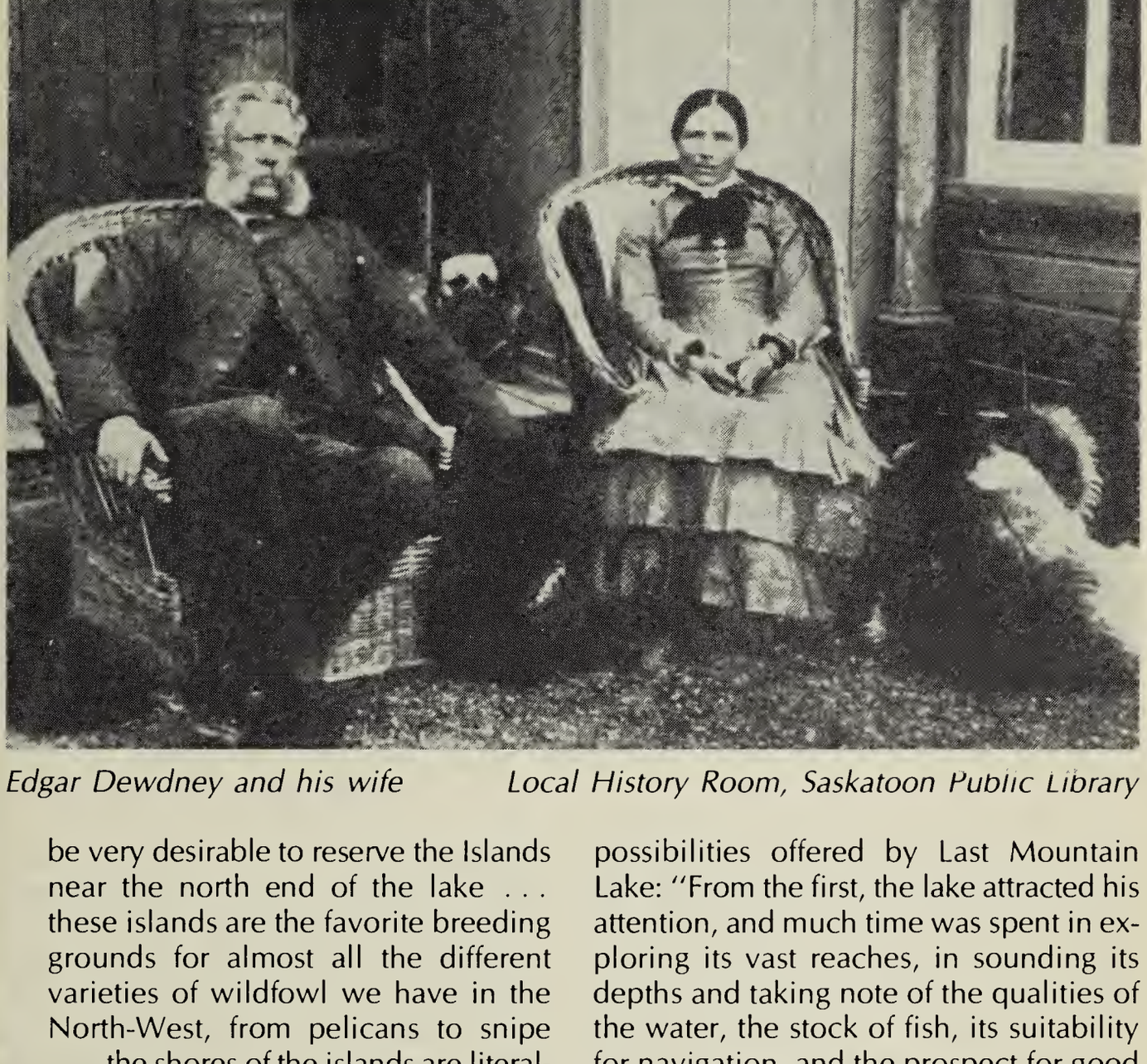
The railway, settlement, and the bird sanctuary

The Canadian government recognized that transport systems were the prerequisite to building a nation from coast to coast by settlement across the prairies. Although the Elbow - Touchwood Hills and the Last Mountain - Fort Qu'Appelle trails provided some access to the Last Mountain Lake area, travel was long and arduous and the mosquitoes were relentless. The idea of a railway across the nation became popular; throughout the 1870's surveyors and scientists were sent west to find suitable routes.

John Macoun was a botanist sent in 1879 to study the flora and fauna of the plains. Partly due to his careful observations the potential of the southern part of the province for agriculture was recognized. Macoun camped near Last Mountain Lake on the largely unspoiled and unsettled land there. He made note of the bird life: "Multitudes of pelican, geese, ducks, avocets, phalaropes, water hens, and grebe, besides innumerable snipe and plover were everywhere, in the marshes at the head of the lake or along its shores, or on small islands lying to the south of the camp. This was early in July and experience tells me that not one tenth was then seen of the bird life assembled in September and October."[9]

Fortunately, Macoun was not alone in recognizing the importance of the area for bird life. By 1883 the Canadian Pacific Railway was stretching across the plains; a company, calling itself the "Qu'Appelle, Long Lake and Saskatchewan Railroad and Steamboat Company" built a railway from Regina to Craven in 1886.[8] The possible consequences of the railroad and the accompanying settlement caused the Lieutenant governor of the North-West Territories, Edgar Dewdney, to write in March 1887 to Thomas White, Minister of the Interior, saying:

> "The reports of the probable extension of the Long Lake Railway this summer has drawn some attention to the land in that neighborhood. I think it would



Edgar Dewdney and his wife *Local History Room, Saskatoon Public Library*

> be very desirable to reserve the Islands near the north end of the lake . . . these islands are the favorite breeding grounds for almost all the different varieties of wildfowl we have in the North-West, from pelicans to snipe . . . the shores of the islands are literally covered with eggs in the breeding season."[12]

As a result, on 8 June 1887, Sir John A. MacDonald and 13 members-in-council set aside approximately 2,534 acres (1,025 ha) of land, including the islands, peninsular land and 11 miles of shoreline.[12] Since sanctuaries in other provinces were not established until 1920, this act was indeed a remarkable accomplishment.

Dewdney's foresight was crucial in protecting these lands from development that could have destroyed valuable breeding grounds. Settlement was quick to follow the railway. In 1902 an Englishman, William Pearson, was impressed with the possibilities offered by Last Mountain Lake: "From the first, the lake attracted his attention, and much time was spent in exploring its vast reaches, in sounding its depths and taking note of the qualities of the water, the stock of fish, its suitability for navigation, and the prospect for good town and camping sites upon its shores."[13] Shortly after he formed the William Pearson Company and bought up much of the land between the hills east of Davidson on the west side of the lake and the Last Mountain and Touchwood Hills on the east side of the lake. Pearson christened the area the "Last Mountain Valley;" a vigorous advertising campaign led to the rapid development of the area. Not surprisingly, his pamphlets praised the wildlife of the lake area, including the abundant fish, fowl and deer.

In 1906, Pearson commissioned several freight barges and steamers to carry freight, home seekers and other travellers to various points along the lake. Lumber yards, elevators, shipping docks and

William Pearson Co. with land seekers travelling to "Last Mountain Valley" in June 1912. *Saskatchewan Archives Board*

towns sprang up along the shore, but the completion of roads and branch railway lines, such as the Regina-Bulyea line completed in 1911, soon brought the steamboat era to an end. The last survivor was the "Qu'Appelle", a passenger steamer capable of carrying 200 people up and down the lake for "picnic and pleasure parties;" it was pulled up on the beach in 1913.[8]

Within a few short years the land had been transformed from a wilderness of prairie into thriving farms and towns. With less land for homesteading a conflict arose over the reserved lands of the bird sanctuary that threatened the sanctuary's existence. The government began to be swayed by the economic benefits of opening up the land and late in 1910 the Dominion Lands Agent in Regina was ordered by the Department of the Interior to "instruct the Homestead Inspector to visit each of the parcels of land mentioned in the Order-in-Council and report whether any good purpose is being served by the continuance of this reservation." In March 1911, 21 settlers in the area signed a petition at Nokomis asking that two sections of peninsular land included in the sanctuary be thrown open for homestead entry.[12] It must be remembered that at this time the importance of breeding grounds for birds was often undervalued or ignored completely, because this new land seemed so rich in wildlife. This mistaken belief in the superabundance of wildlife has often been a cause of the quick decline of many species in North America.

Before the petition was acted upon, one of its signers made an active protest of his own against the bird reserve. In 1908 E.O. Taylor applied to homestead a parcel of land that was part of the reserved land. He "was advised that his entry could not be allowed to stand, but he appears to have gone into residence upon the land and made application for patent therefore on the 17th November, 1911."[13] Taylor would have to wait a few years while the government decided what to do with the

Cabin of the S.S. Qu'Appelle *Saskatchewan Archives Board*

bird sanctuary.

Meanwhile a Homestead Inspector's report, dated 1 December 1911, suggested that in cases where the land was fit for cultivation, the reservation should be discontinued, but that alkali and peninsular land as well as the islands should continue to be reserved. The inspector also felt that the lakefront should be reserved because "the time is coming when the lakefront will be sought after for camping purposes . . . to say nothing of fishing . . ." and would "prove valuable as a public playground."[12]

In 1912, the Minister of the Interior decided that "the lands are to be allowed to stand as they are for the present," but finally in 1913 he recommended that since Taylor had completed his required settlement duties on a portion of the bird reserve, he should be granted patent for the quarter section.[12] The adjustments were made, but fortunately for the sanctuary, such cases were few and most of the land was retained for the wildfowl. Even as late as 1919, settlers made inquiries about the land, and requests for boundary adjustments were continually turned down. The sanctuary survived the settlement crisis.

Development of wildlife protection

The establishment of the bird sanctuary at Last Mountain Lake did not signify a popular movement towards wildlife protection by the government or the public. When men such as Gordon Hewitt began working towards improving government policy concerning migratory birds, no mention was made of the sanctuary at Last Mountain Lake. In Hewitt's "Protection of Birds" report in 1916 he mistakenly declared that Canada possessed no government bird sanctuary.[4] The reserved lands were remembered, however, when the Migratory Birds Convention Act was passed in 1917, "a landmark in the evolution of the Canadian government's role in wildlife protection."[4] A federal Migratory Bird law had been passed in the United

Settler's log cabin *Canadian Wildlife Service*

States in 1913, but since these birds summered high in the Canadian Arctic and travelled the length of the continent to winter in the southern states and Mexico, such legislation was ineffective unless Canada and Mexico passed similar laws. Finally in 1917 migratory birds were recognized as an international resource, the protection of which would require federal intervention to set up international and interprovincial cooperation.

Under the Migratory Birds Convention Act, the Governor-General in Council was given authority to make all necessary regulations to protect migratory game, insectivorous and nongame birds inhabiting Canada at any time during the year, and to appoint game officers. The Act listed each species and set forth open and closed hunting seasons in each province.[4] In 1915, while treaty negotiations were in progress, steps were taken towards the establishment of more bird sanctuaries in Canada. All vacant quarter sections adjoining certain lakes in Saskatchewan were reserved from settlement.[10] In 1917 and 1918 R.M. Anderson, a zoologist for the Geological Survey and a member of the Advisory Board in Wild Life Protection, visited and evaluated each of the proposed sanctuaries as well as the one at Last Mountain Lake. Of the latter he wrote "This is a very good breeding ground, with many large ducks, canvasbacks, redheads, and mallards; a few Canada geese nest on the islands, also cormorants and gulls. It is well posted as a provincial game refuge. It should by all means be retained as a Sanctuary."[6]

In 1920 regulations were passed that governed bird sanctuaries and prohibited the killing and molesting of birds, the destruction of their nests or eggs, and the carrying of firearms or appliances for killing birds on sanctuary land. No person was to use any part of a sanctuary unless he had a permit, licence or lease to do so. The Director could "by permit, authorize in any year a person to shoot wild ducks and geese in such portion of a bird sanc-

tuary and during such time as the Minister may from time to time decide."[10] This clause which seemed to contradict the basic purpose of a sanctuary became even more pronounced when Last Mountain Lake Bird Sanctuary was brought under the provisions of the federal regulations contained in the Migratory Birds Convention Act on 26 July 1921. The sanctuary was expanded to include the entire water area of the lake as well as certain small islands and land areas, and a new clause stated that: "The lawful shooting of game birds in the open season shall be allowed on all portions of the Last Mountain Lake Bird Sanctuary except the islands north of and including Pelican Island."[1 12] Unless hunting continued to be permitted, the game preserve could not be brought into the federal scheme.

At this time, administration of the sanctuary was carried out by the federal National Parks Branch in Ottawa. To ensure that all the new laws were followed, early policing of the sanctuary was conducted by the Royal Canadian Mounted Police, provincial game guardians, or volunteer game guardians acting without pay. Captain William C.Huggins of Imperial Beach was a volunteer game guardian from about 1921 to 27 March 1925, when he was appointed part-time caretaker of the Last Mountain Lake Bird Sanctuary at a salary of $50 per year.[1]

Huggins encountered many difficulties in trying to protect the sanctuary. In a 1923 letter to J.B. Harkin, the Commissioner of the Canadian National Parks Branch, Huggins wrote: "So far the game birds are not molested in the closed season, but in the open season the hunters go after the birds. The north end of Last Mountain Lake is acknowledged by all the game bird hunters as the best hunting grounds in the Province of Saskatchewan. But the birds are very poorly protected . . . as the grain harvest is on at the time that the birds are going south the guardian can not get away, and the hunters know that and do as they please . . . it is common for two men to get 100 to 125 ducks in forenoon."[1] Other problems included illegal hay cutting, fencing and grazing on sanctuary land. In most cases the RCMP were called in to investigate.

Another problem erupted concerning weed control on the sanctuary. Noxious weeds such as sow thistle grew in the long grasses required for nesting cover. Farmers believed the seeds from such weeds were a menace to surrounding farmlands, and many complaints were filed by farmers who felt they should be allowed to hay or graze animals on the sanctuary land "to control the weed problem." No funds were available for weed control on bird sanctuaries, but eventually the Municipal Weed Inspector instructed local day laborers to mow patches to keep them from going to seed. Examination showed weeds in the sanctuary were no worse than on surrounding lands. Farmers were using the weed problem as a reason to seek haying and grazing rights. However, by 1929, Huggins was instructed to cut all sow and Canadian thistles and other noxious weeds on the islands and portions of the mainland sanctuary.[1]

In 1925, an Order-in-Council passed in Ottawa stated the purposes of establishing bird sanctuaries in Saskatchewan: "That the Great Plains region of Canada contains probably the most valuable breeding grounds in North America for the wild water-fowl of the Continent and that it is important that measures should be taken to set apart permanently certain areas for the propagation of bird life, a resource of economic value in providing sport and food; . . . That the advance of settlement, followed by cultivation of the land, the drainage of lakes and marsh areas for development purposes, has seriously restricted the areas suitable for the propagation of wild water-fowl and under present conditions it is necessary that proper means should be taken to check the decrease in the number of these birds to

guard against the danger of extermination . . ."[10]

The federal government appeared to understand the real purpose of the sanctuaries, but was having problems administering to their needs. In 1930, the sanctuary lands were turned over to the provinces under the Natural Resources Transfer Agreement. The Province of Saskatchewan agreed to preserve the Last Mountain Lake Bird Sanctuary, and administered it until 1951. From the National Parks Branch in 1947 came the Canadian Wildlife Service, which was given the administration of the sanctuaries across Canada.[4]

In the 1930s, the drought caused many changes in the bird sanctuaries of Saskatchewan. At Last Mountain Lake, farmers were allowed to apply for permits to cut hay for feed for their livestock on sanctuary land.[1] While other sanctuaries dried up, the permanency of Last Mountain Lake ensured its importance as migratory bird habitat. In 1946, as a result of the drought, agriculturalists who wanted more pasture land and people who felt that many sanctuaries were not serving the purposes for which they had been established, pressured the authorities to amend the Natural Resources Transfer Agreement. Bird sanctuaries and public shooting grounds could be dismantled.[10]

The entire system of bird sanctuaries came under review. In 1948 and 1949-50 Last Mountain Lake Bird Sanctuary was inspected for suitability for a waterfowl refuge, and then to determine whether adjacent land should be released for sale. J.D. Soper, the Dominion Wildlife Officer for the prairie provinces, concluded that at Last Mountain Lake only one half section of land had been dried out excessively and made untenable.[14] All of the other land was retained. Many of Saskatchewan's other federal sanctuaries were either discontinued or newly established without land areas.

In 1957 the Canadian Wildlife Service recorded data on the physical characteristics of the Last Mountain Lake Bird Sanctuary and the amount of migratory bird and public utilization. Once more, the area was evaluated as excellent grounds for a sanctuary where public use could be compatible with the protection of wildlife. It was recommended that federal government aid be granted to further develop public areas.[1] The area that had been operated as a beach since 1954 by the Govan-Nokomis Fish and Game League was enlarged to 72 hectares and withdrawn for development as a regional park. The open shoreline was transformed over a period of years into a treed park with a beach, playground, boat launch, golf course and camping facilities.

During the 1960s, management efforts were increased by the Canadian Wildlife Service. Conflicts between agriculture and wildlife protection continued. Increased agricultural use of the lands adjacent to the sanctuary reduced the quality and quantity of wildlife habitat. Crop depredation by waterfowl and sandhill cranes became a major problem. From 1960 to 1963, the Canadian Wildlife Service biologists conducted research on control of crop damage. The Canadian Wildlife Service and the Wildlife Branch of the Saskatchewan Department of Natural Resources cooperated to design a permanent management scheme for the area. As a result, in 1966 negotiations began with local farmers for the purchase of land around the north end of the lake; by the end of 1967 approximately 5,260 ha had been purchased by the Canadian Wildlife Service.

In early 1971 Canada and Saskatchewan signed a Memorandum of Understanding which dedicated the federal lands which had been acquired and 3,230 hectares of provincial lands to wildlife conservation. This created the first cooperative wildlife area in Canada, to be known as the Last Mountain Lake Wildlife

Breaking prairie in section 28-28-24-W3, early 1900s
Saskatchewan Archives Board

Management Unit. Since 1968 the Canadian Wildlife Service has employed an Area Manager who lives on the management unit all year. His job is to maintain the natural habitat and its wildlife and to reduce conflicts between the wildlife, agricultural and public recreational activities in the area. Lure crops, which had been attempted in the early 1950s readily grew on the newly purchased farmland, creating feeding areas in close proximity to the natural marsh.

Ducks Unlimited Canada has contributed significantly to management of the area by constructing dams to control water levels in some of the marshlands, thereby improving waterfowl habitat.

The Last Mountain Lake Wildlife Area was selected in 1970 as part of the International Biological Program, a world-wide research plan concerned with the examination and inventory of the remaining natural ecosystems of the world, the assessment of the adequacy of the present national protected-area systems, and recommendations of areas for preservation or improvement. The once forgotten sanctuary had become part of an international conservation plan.

Last Mountain Lake was given further recognition in 1982 when the Migratory Bird Sanctuary and Wildlife Management Unit lands were designated under the Ramsar Convention on the Conservation of Wetlands of International Importance, as an internationally valuable wetland of high biological productivity and consequent human interest. International recognition of the importance of this site ensures that every effort will be made to prevent jeopardization of its integrity.

The Future

On 5 June 1987, the Honourable Tom McMillan, Minister of the Environment for Canada, and the Honourable Colin Maxwell, Minister of Parks, Recreation and Culture for Saskatchewan signed an *Agreement for the Establishment of Last*

Mountain Lake National Wildlife Area. Under this agreement provincial crown uplands totalling over 3200 ha will be transferred to Canada to be included in a National Wildlife Area. Part of the north end of the lake will continue to be administered as a federal Migratory Bird Sanctuary.

It was fitting that this event took place on World Environment Day and that His Royal Highness The Duke of Edinburgh, Prince Philip was witness to the Agreement. Over 1500 people, including local citizens, school children and delegates to the 16th Annual Canadian Nature Federation Conference participated in the celebrations.

Today, the Last Mountain Lake National Wildlife Area and Migratory Bird Sanctuary contains over 14,300 ha of lake, wetlands and prairie. Beginning as a plot of reserved lands, it has survived many human use conflicts. Yet, even today, with so much being done for wildlife protection, increased public use of the lake affects the sanctuary through pollution and disturbance, and threatens to cause future declines in wildlife.[15] Only with public understanding and cooperation can this important wildlife area survive another century.

Acknowledgements

I would like to thank the staff of the J.G. Diefenbaker Centre, University of Saskatchewan, Saskatoon for providing me with archival material and the staff of the Canadian Wildlife Service, Saskatoon, especially Phil Taylor, for giving me access to their records and library.

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FIRE ON GRASSLANDS - FRIEND OR FOE?

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Fire is commonly perceived as a destructive force associated with the loss of forests or other material objects. We are schooled in the prevention or suppression of fire, and rightly so. However, not all impacts of fire are negative! Both grasslands and forests evolved with fire as one of the natural agents, resulting in diversity of form and species. This paper discusses grasslands and fire, first historically, then from a wildlife management context, concluding with an example of fire as a potential management tool with some results from a study at Last Mountain Lake.

Fire in grasslands

Climate and fire are the primary agents affecting the origin and development of native grasslands in North America.[9] Lightning is the only agent of fire, excluding man, which could have had a major role in modifying North American grasslands prior to European settlement. A lengthy and heated debate, on the importance of lightning as a factor in maintaining grasslands, raged amongst ecologists for the first half of this century. Several sources of evidence terminated the debate, including observations from the journals of early explorers and direct evidence found by several ecologists.[8 9 10 11 12 15 18 19]

The historical record for lightning set prairie fires comes from journals like that of Peter Fidler, a Hudson Bay Company trader and explorer, written while he visited southern Alberta in 1792:

> "These large plains either in one place or another is constantly on fire and when the grass happens to be long and the wind high, the sight is grand and awful, and it drives along with amazing swiftness. The lightning in the spring and fall frequently lights the grass. . ."[12]

Recent observations by Rowe and Higgins document the actual frequency and intensity of lightning fires in prairie Saskatchewan and North Dakota, respectively.[15 9] Saskatchewan wild fires set by lightning occurred primarily during September in the range country south and west of Swift Current. Ranchers interviewed from the Fir Mountain and Battle Creek areas indicated that lightning fires were very common. One lightning bolt is reported to have pronged out and started three fires about 7 miles apart.[15] Of the lightning-set fires in North Dakota 73% occurred during July and August with lesser numbers observed in April, May, June and September. The frequency of these fires varied across the state from 6.0 per 10,000 km^2 in the east to 24.7/10,000 km^2 in western North Dakota.[9]

The native peoples started fires accidentally, or they deliberately set them for ceremonial, superstitious or other reasons, such as an offering for fair weather or the return of a war party. Fire was used for war, signalling, hunting and controlling the movement of wildlife.[12] In the 1800s many large prairie fires resulted from the carelessness of cattle outfits.[18]

Collectively, fires, climate and grazing of herbivores like the buffalo, maintained a diverse grassland devoid of the large stands of shrub and matted dead grass which now dominate many of our grasslands. Today even lightning fires are contained by cultural obstacles and practices, such as roads, cultivated fields, heavily grazed pastures, and suppression techniques that European settlers brought to the prairies.

Prairie with thickly matted dead grass *P.S. Taylor*

Fire as a wildlife management tool

Wildlife managers have begun to use fire as a management technique, which they refer to as "prescribed burning". Prescribed burning can be defined as the skillful application of fire to natural areas under specified conditions of weather and fuel moisture. Properly done, a prescribed burn will allow confinement of the fire to the desired area and at the same time produce sufficient heat and rate of spread to accomplish management objectives. Some of the objectives of prescribed burning are as follows:

to improve distribution of birds and mammals through habitat diversification;
to remove accumulated dead plant material or fuel;
to control the encroachment of undesirable plants and encourage desirable plants such as legumes for forage, soil improvement, etc.;
to control or destroy insects or disease;
to improve plant vigor;
to release nutrients and improve moisture penetration and to remove unpalatable growth remaining from previous seasons.[3 8 19]

Prescribed burning at Last Mountain Lake

Four 45-acre study plots were established at the north end of Last Mountain Lake in the fall of 1982 and data collection began in the spring of 1983. On these plots the composition of the grassland plants prior to and following the prescribed burns was monitored, as were the populations of eight passerine birds and four small mammal species.

Approximately one-half of each of the study plots was burned by a single burn in the fall under a fixed set of conditions, i.e. winds with a speed close to 16 kph, temperature of 10° C, and relative humidity of 30-50% with a slightly moist litter layer (the layer of dead and detached vegetation and vegetation parts lying on the mineral surface).

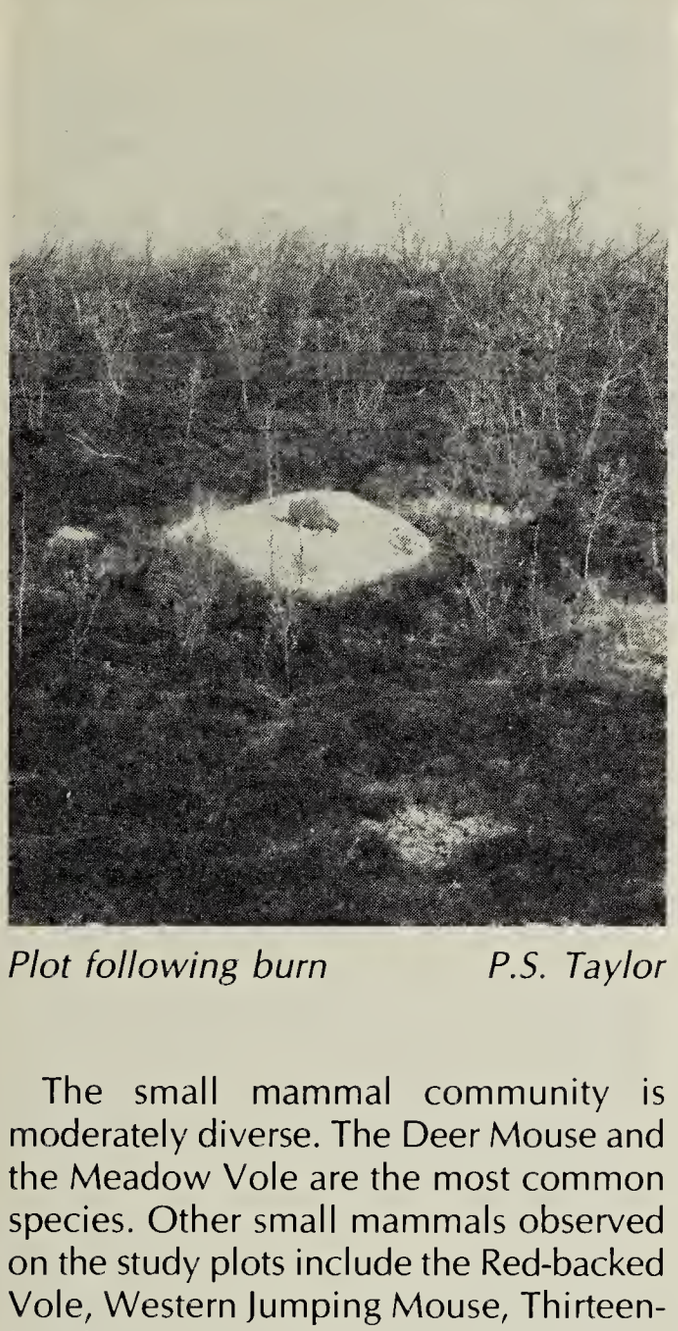
On the study plots over the past four years, 106 species of vascular plants were found (approximately one-third of the species listed for Last Mountain Lake).[5] There were 9 species of trees and shrubs, 4 sedges, 23 grasses and 70 forbs.

The north end of Last Mountain Lake lies at the interface of the Mixed Prairie to the southwest and the Fescue Prairie to the northeast.[4 6 7 14] The Last Mountain Lake grassland is dominated by Rough Fescue (*Festuca scabrella*) and Spear Grass (*Stipa comata*) with associated species including Northern Wheatgrass (*Agropyron dasystachyum*), Slender Wheatgrass (*A. trachycaulum*), Sand Grass (*Calamovilfa longifolia*), Blue Grama (*Bouteloua gracilis*), June Grass (*Koeleria cristata*) and Kentucky Blue Grass (*Poa pratensis*). The most common forbs of the area are Pale Comandra (*Comandra pallida*), Field Chickweed (*Cerastium arvense*), Prairie Crocus (*Anemone patens*), Silverleaf Psoralea (*Psoralea argophylla*), Goldenbean (*Thermopsis rhombifolia*), Northern Bedstraw (*Galium boreale*), Early Blue Violet (*Viola adunca*), sage (*Artemisia frigida* and *A. ludoviciana*) and goldenrod (*Solidago canadensis* and *S. missouriensis*), with Western Snowberry (*Symphoricarpos occidentalis*) as the most common shrub.

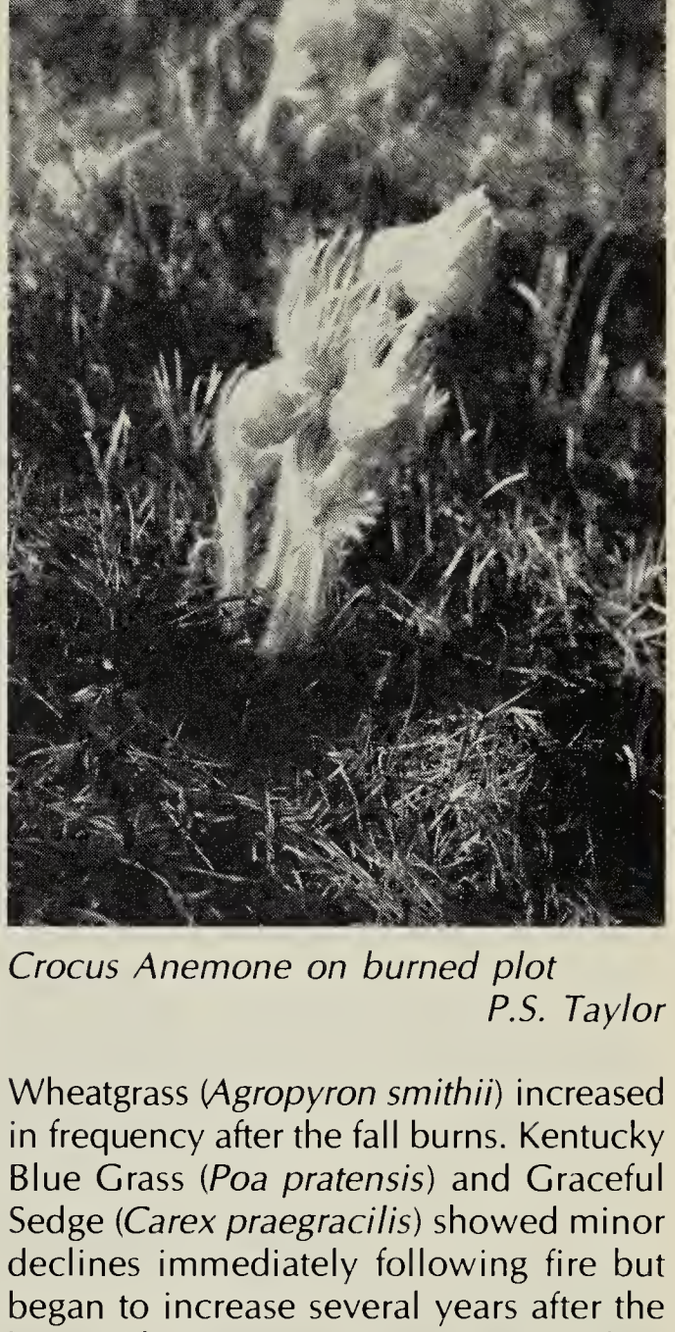
The two most common birds inhabiting the study plots are Clay-colored and Savannah sparrows. Associated with them in somewhat diminishing order of abundance are Baird's Sparrow, Eastern Kingbird, Brown-headed Cowbird, Red-winged Blackbird, Western Meadowlark, Sprague's Pipit, Horned Lark, Yellow Warbler, Wilson's Phalarope, Upland Sandpiper, and duck species including Mallard, Northern Pintail, Blue-winged Teal, Lesser Scaup and White-winged Scoter. Several raptors nest on the study plots or adjacent to them, including Northern Harrier, Short-eared Owl and Swainson's Hawk.

Fire guards for prescribed burning *P.S. Taylor*

Prescribed burning plots under favorable conditions *P.S. Taylor*



Plot following burn *P.S. Taylor*



Crocus Anemone on burned plot *P.S. Taylor*

The small mammal community is moderately diverse. The Deer Mouse and the Meadow Vole are the most common species. Other small mammals observed on the study plots include the Red-backed Vole, Western Jumping Mouse, Thirteen-lined Ground Squirrel, Richardson's Ground Squirrel and Least Weasel.

Other mammals such as White-tailed Deer, Coyote, Red Fox and Muskrat have been observed on or near the study plots.

Some Observations from the Prescribed Burn Study

The composition of the plant community on the burned sites was not dramatically altered by fire. Very few species observed in 1983, prior to the prescribed burns, were absent in 1986. Neither Rough Fescue nor Spear Grass, the two codominant grass species, declined with the fire treatment. Other species such as Sand Grass, Slender Wheatgrass and Western Wheatgrass (*Agropyron smithii*) increased in frequency after the fall burns. Kentucky Blue Grass (*Poa pratensis*) and Graceful Sedge (*Carex praegracilis*) showed minor declines immediately following fire but began to increase several years after the burns. These positive responses resulted from the removal of a heavy layer of dead vegetation which restricted penetration of both light and moisture required by plants for growth. In places, a modestly thick litter layer functions in a similar manner but, with its partial removal by fire, moisture or nutrients once trapped are now available to plants for growth.

The forbs generally flourished the first year following a fire, then either continued to increase or gradually declined to their pre-fire levels. Large increases were recorded for Prairie Crocus, American Vetch (*Vicia americana*), Pygmy-flower (*Androsace septentrionalis*) and Silverleaf Psoralea. Modest gains occurred for Field

Table 1. SMALL MAMMAL POPULATIONS ON THE STUDY PLOTS AT LAST MOUNTAIN LAKE

		Plots				
Year		*A*	*B*	*D*	*E*	*Total*
1983	*Control Sites*	27*(3)**	17 (3)	20 (2)	10 (1)	18.3 (4)
1984		10 (2)	0	2 (1)	0	2.9 (3)
1985		3 (2)	3 (1)	10 (1)	0	4.2 (2)
1986		5 (1)	0	0	0	1.3 (1)
1983	*Burn Sites*	12 (2)	8 (3)	17 (3)	14 (1)	12.7 (4)
1984		5 (2)	0	0	5 (2)	2.3 (2)
1985		8 (2)	12 (1)	20 (1)	3 (1)	10.8 (2)
1986		*6 (1)*	*3 (2)*	*2 (1)*	*2 (1)*	3.1 (2)

* Captures per 100 trap nights
** Number of species captured
▨ Number of captures on sites which had been burned

Chickweed, Golden-bean, Many-flowered Aster (*Aster pansus*), and Moss Phlox (*Phlox hoodii*). Smooth Perennial Sow-thistle (*Sonchus arvensis*) and Large-flowered False Dandelion (*Agoseris glauca*) declined after fire. Like grass, the forbs benefited from the removal of massive amounts of dead vegetation and litter. The burning of the dead vegetation increased light, moisture penetration, and seed bed temperature allowing seeds to germinate which were otherwise trapped in the litter layer, and released nutrients.[1 2 18 19]

Small mammal populations have varied considerably from the beginning of the study on both the control and burned portions of the study plots (Table 1). On unburned areas mice were live-trapped at the rate of 16 per 100 trap-nights in 1983 (total number of mice caught divided by total number of trap-nights, multiplied by 100). This declined to 2.6 in 1984, increased to 7.6 in 1985 then decreased to 2.2 in 1986. On the burned areas mice were captured at a rate of 0 to 20 per 100 trap-nights while on these sites prior to burnings the rates varied from 0 to 14 mice per 100 trap-nights.

Meadow Voles and Deer Mice dominated the captures in 1983. In 1984 there were slightly more Western Jumping Mice than Meadow Voles caught. In 1985 and 1986 more than 90 percent of all small mammals caught in the live traps were Deer Mice. Western Jumping Mice replaced Meadow Voles in 1986 as the only other species captured. The majority of captures (65%) were on the burned portions of the plots.

The Deer Mouse is recognized as a pioneering species. Ream indicated that Deer Mice occur in most vegetation types through a broad range of plant succession, but in most sites Deer Mouse populations are never very dense.[13] This species is usually found on disturbance sites such as burned over areas. Deer Mice may flourish on these sites because they eat the seeds exposed after litter is burned away, and feed upon the flush of insects and seeds produced following fire. They appear to need very little litter as cover during midsummer, although during the breeding season the species may confine its activities to areas where sufficient nesting materials, litter and mats of dead grass, are present. Fire may have en-

hanced survival for this species, but apparently for no other small mammal.

Factors resulting in the high variability of small mammal numbers may have included the weather, the loss of habitat, and some inherent biological control. In 3 of the last 5 years precipitation has been lower than normal. Low moisture conditions can cause a poor seed crop which may adversely affect small mammal densities. For species other than the Deer Mice, the burned portions of the study plots may not provide sufficient cover while they search for food or attempt to breed. Only one Meadow Vole and one Western Jumping Mouse were captured on burned areas in three years of study.

Another indicator of changes in mouse populations was the number of raptors nesting on or next to the study plots. At the beginning of the study four Northern Harrier nests and one Short-eared Owl nest were found on the plots; subsequently no nesting occurred until this past summer. A harrier nest with three young and an egg was found in late June on one of the plots; its fate is not known although no fledged young were seen in late July. Both Short-eared Owl and Northern Harrier depend on mice as a major food source.

Bird population information from two of the four study plots (Table 2) illustrates the change in bird diversity and density which resulted from burning one-half of each of the study plots. The history of these two plots before the prescribed burns was quite different. Plot B was native grassland which had been lightly grazed. Plot E was partially broken as well as grazed prior to 1945. Thus the plant community of Plot E is a combination of native and non-native species, the prominent non-native being Quack Grass (*Agropyron repens*) with some Smooth Brome Grass (*Bromus inermis*) and native Kentucky Blue Grass and Fowl Blue Grass (*P. palustris*). The first spring following a prescribed burn young green vegetation was available early in the spring; bird use was restricted to grazing by Canada Geese and various ducks and to nest initiation by Horned Lark and Killdeer. Other species, for example Savannah and Clay-colored Sparrows, occupied these sites briefly (homing to a previously used territory or nest site is common within the passerine group[16 17]) but the majority did not establish territories or commence to nest (Table 2). Two years after the fire, bird numbers and diversity began to increase on the burned sites. The density of the vegetation had increased. Baird's Sparrow which previously had not nested on the site established a territory in the second year and four territories in the third year after burning.

Three summers after the prescribed burns, the bird populations on two of the burned sites were approximately one-half the density and twice the diversity of the pre-fire counts. The live and standing dead vegetation had increased but not yet reached the pre-burn state where mats of dead vegetation and a fairly broad canopy of shrub cover effectively excluded all but two bird species.

Concluding thoughts

Fire is, at the outset, destructive, eliminating places for birds and small mammals to live, but as the sites recover from burning the benefits to wildlife are many. Grassland vegetation responds to fire through renewed, vigorous growth, providing sufficient structural diversity, coupled with other changes such as higher ratios of bare ground to litter cover, to result in a more complex habitat for both native and non-native grassland areas. These changes in the plant community are then followed by changes in bird populations and, presumably, small mammals also increase in diversity. Even on marginal quality grasslands, viewed by many as waste areas, fire can provide enhancement of habitat which leads to increased bird diversity.

Table 2. PASSERINE TERRITORIES ON TWO STUDY PLOTS AT LAST MOUNTAIN LAKE*

Species	*Plot B*				*Plot E*			
	1983 *Before*	1984 1 Year	1985 *After* 2 Years	1986 3 Years	1983 *Before*	1984 1 Year	1985 *After* 2 Years	1986 3 Years
Eastern Kingbird	1	-	-	-	1	-	1	1
Savannah Sparrow	5	1	3	1	16	3	9	9
Baird's Sparrow	-	-	-	2	-	-	1	2
Clay-colored Sparrow	26	2	3	12	18	1	3	3
Western Meadowlark	-	-	2	1	-	-	1	1
Horned Lark	-	1	1	1	-	1	-	1
Bobolink	-	-	-	-	-	-	-	1
Total	32	4	9	17	35	5	15	18

* Data from the burned portions of the study plots B and E, where the burning took place between the nesting seasons of 1983 and 1984.

Young Northern Harriers *Gary W. Seib*

The frequency of prescribed burns on native and non-native grasslands could be once in 6 or 7 years. A more frequent schedule, especially on light soils, would seriously affect the amount of organic material incorporated into the upper soil.

In conclusion, fire can be viewed as a friend, when used as a tool for rejuvenation and diversification of ecosystems.

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IMAGES OF LAST MOUNTAIN LAKE

Compiled by G.W. BEYERSBERGEN and P.S. TAYLOR, Canadian Wildlife Service, Saskatoon, Saskatchewan. S7N 0X4

P.S. Taylor

Often, whole acres would be red and purple with beautiful flowers and the air laden with the perfume of roses.

— J.A. Macoun, from his journal, 1879.[3]

G.W. Beyersbergen

Man has nothing that the animals have not at least a vestige of, the animals have nothing that man does not in some degree share.
— Ernest Thompson Seton, 1898.[4]

P.S. Taylor

G.W. Beyersbergen

The grass, the swamps and the lakeshore are alive with birds. . . . All this in the wide prairie land, which so many people think dull and uninteresting.
— R.D. Symons, 1967.[5]

G.W. Beyersbergen

G.W. Beyersbergen

Far from the shore the notes of western grebes reach back, and always the gulls weave their aerial patterns between earth and sky.

— R.D. Symons, 1967.[5]

Gary Anweiler

G.W. Beyersbergen

. . . the grasshopper tribe play their hurdy-gurdys on every hot hillside until the very grass vibrates . . .

— R.D. Symons, 1967.[5]

The Sandhill Crane you are bound to see in fall, if you visit the north end of Last Mountain Lake, that level stretch of sandy, untouched prairie speckled with rose bushes and alive with grasshoppers.

— R.D. Symons, 1967.[5]

G.W. Beyersbergen

Overleaf: G.W. Beyersbergen

P.S. Taylor

The Wilderness should now no longer be considered as a playground for vandals, or a rich treasure trove to be ruthlessly exploited for the personal gain of a few. . .
— Grey Owl, 1936.[1]

It lies within our power to preserve for ourselves, but more particularly for posterity for whom we hold it in trust, the wild life of this country.
— C. Gordon Hewitt, 1921.[2]

G.W. Beyersbergen

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Overleaf: G.W. Beyersbergen

PLANTS OF THE LAST MOUNTAIN LAKE NATIONAL WILDLIFE AREA

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The Last Mountain Lake National Wildlife Area, located at the northern end of Last Mountain Lake, is within the Mixedgrass Prairie Ecodistrict of the Grasslands Ecoregion.[3] In Canada most of this grassland type has been drastically altered by agricultural practices including cultivation and intensive grazing. Thus, few areas have maintained their native character. The habitats within the wildlife area include grasslands which have never been subjected to intensive agricultural practices and remain in nearly their natural state.

This preliminary annotated plant list is based largely upon collections housed in the Canadian Wildlife Service Herbarium, Saskatoon. Most of the specimens were collected by G.G. Anweiler in 1969 and P.S. Burton in 1983, but W.C. Harris, E.A. Driver, P.S. Taylor and J.R. Caldwell also contributed with their findings. This list is not a complete flora, for the wildlife area has not been thoroughly searched for plants.

This annotated list includes 318 species and one variety found in or near the Last Mountain Lake National Wildlife Area. The list is organized into 58 plant families arranged in the order accepted by most standard manuals.[6] Information on habitat was obtained from herbarium collection labels. The scientific and common names used follow those of Moss where possible.[8]

Most of the species listed are common on the National Wildlife Area, but a few are uncommon, including Water Foxtail, Sheep Fescue, Salt-marsh Sand Spurry, Few-flowered Aster and Upland White Goldenrod. The provincial floral emblem, the Western Wood Lily, was found in several locations, but is not abundant.

Gaillardia *P.S. Taylor*

Because all plants are protected in the National Wildlife Area, observations of new or unusual plants should be documented by taking careful notes and photographs. Such information would be welcomed by the Area Manager or Habitat Management staff in Saskatoon.

Acknowledgements

The authors would like to thank J.Y. Marchand and V.L. Harms of the Fraser Herbarium, University of Saskatchewan, Saskatoon, for their assistance in verifying the identity of plants collected at Last Mountain Lake.

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Smooth Camas *A. Whyte*

ANNOTATED LIST OF VASCULAR PLANTS OF LAST MOUNTAIN LAKE AND STALWART MARSH NATIONAL WILDLIFE AREAS

COMMON NAME	*SPECIES*	*HABITAT*
Spike-moss Family: Selaginellaceae		
Prairie Selaginella	*Selaginella densa* Rydb.	grasslands, dry soils, eroded sites
Horsetail Family: Equisetaceae		
Common Scouring-rush	*Equisetum hyemale* L.	wetland margins, low areas
Smooth Scouring-rush	*Equisetum laevigatum* A.Br.	sandy lake shore, moist areas
Meadow Horsetail	*Equisetum pratense* Ehrh.	moist sandy areas
Cattail Family: Typhaceae		
Common Cattail	*Typha latifolia* L.	slough margins, marshes, lakes
Pondweed Family: Zosteraceae		
Sago Pondweed	*Potamogeton pectinatus* L.	ponds, marshes,lakes
Richardson's Pondweed	*Potamogeton richardsonii* (Benn.) Rydb.	ponds, marshes,lakes
Sheathed Pondweed	*Potamogeton vaginatus* Turcz.	sloughs, lake, Basin A
Widgeon Grass/W. Ditch-grass	*Ruppia occidentalis* Wats.	lake, marshes, saline sloughs
Arrow-grass Family: Juncaginaceae		
Seaside Arrow-grass	*Triglochin maritima* L.	wet areas, near lake
Marsh Arrow-grass	*Triglochin palustris* L.	marshy areas
Water-plantain Family: Alismaceae		
Narrow-leaved Water-plantain	*Alisma gramineum* K.C. Gmel.	sloughs, marshes
Common Water-plantain	*Alisma plantago-aquatica* L.	sloughs, marshes
Arum-leaved Arrowhead	*Sagittaria cuneata* Sheld.	slough edges
Grass Family: Gramineae		
Crested Wheatgrass	*Agropyron cristatum* (L.) Gaertn.	seeded for pasture and hay
Northern Wheatgrass	*Agropyron dasystachyum* (Hook.) Scribn.	native grasslands
Quack Grass	*Agropyron repens* (L.) Beauv.	distured areas, introduced
Western Wheatgrass	*Agropyron smithii* Rydb.	moist areas, prairie, parkland
Slender Wheatgrass	*Agropyron trachycaulum* (Link) Malte	moist areas around lakes and sloughs
Rough Hair Grass	*Agrostis scabra* Willd.	meadows, woods, waste places
Water Foxtail	*Alopecurus geniculatus* L.	moist soils, slough edges
Wild Oat	*Avena fatua* L.	croplands, introduced
Slough Grass	*Beckmannia syzigachne* (Steud.) Fern.	slough margins, wet areas
Blue Grama	*Bouteloua gracilis* (HBK.) Lag.	dry native grassland
Awnless/Smooth Brome	*Bromus inermis* Leyss.	roadsides, seeded pastures
Northern Reed Grass	*Calamagrostis inexpansa* A.Gray	wet meadow, on island
Plains Reed Grass	*Calamagrostis montanensis* Scribn.	moist grasslands
Narrow Reed Grass	*Calamagrostis neglecta* (Ehrh.) Gaertn., Mey. & Schreb.	wet meadows, slough edges
Sand Grass	*Calamovilfa longifolia* (Hook.) Scribn.	sandy areas
Salt Grass	*Distichlis stricta* (Torr.) Rydb.	saline flats
Canadian Wild Rye Grass	*Elymus canadensis* L.	beaches, banks, sandy areas

COMMON NAME	*SPECIES*	*HABITAT*
Northern Rough Fescue	*Festuca altaica* Trin.ssp. *hallii*(Vasey)Harms	native prairie
Sheep Fescue	*Festuca ovina* L.	moist areas on prairies
Tall Manna Grass	*Glyceria grandis* S. Wats.	slough edges, lakeshore
Hooker's Oat Grass	*Helictotrichon hookeri* (Scribn.) Henr.	moist to moderately dry prairie
Sweet Grass	*Hierochloe odorata* (L.) Beauv.	wet areas, moist grasslands
Wild Barley	*Hordeum jubatum* L.	saline flats, marsh, roads
Barley	*Hordeum vulgare* L.	lure crops
June Grass	*Koleria gracilis* Pers.	prairie grasslands
Prairie Muhly	*Muhlenbergia cuspidata* (Torr.) Rydb.	native grasslands
Mat Muhly	*Muhlenbergia richardsonis* (Trin.) Rydb.	moist, often saline grasslands
Witch Grass	*Panicum capillare* L.	dry marsh, prairie, introduced
Common Reed Grass	*Phragmites communis* Trin.	lakeshore, marshes
Canby Blue Grass	*Poa canbyi* (Scribn.) Piper	moist, often alkali, meadows
Early Blue Grass	*Poa cusickii* Vasey	dry prairie
Fowl Blue Grass	*Poa palustris* L.	moist meadows, lakeshore
Kentucky Blue Grass	*Poa pratensis* L.	pastures, moist prairie
Nuttalls' Salt-meadow Grass	*Puccinellia nuttalliana* (Schultes) Hitchc.	moist to dry alkaline soils
Spangletop	*Scolochloa festucacea* (Willd.) Link	sloughs and marshes
Green Foxtail	*Setaria viridis* (L.) Beauv.	introduced, farmyards, fields
Alkali Cord Grass	*Spartina gracilis* Trin.	alkali areas, sandy soils
Spear Grass	*Stipa comata* Trin. & Rupr.	dry prairie
Western Porcupine Grass	*Stipa spartea* Trin. var. *curtiseta* Hitchc.	dry prairie
Green Needle Grass	*Stipa viridula* Trin.	dry to moist shrubby areas
Sedge Family: Cyperaceae		
Awned Sedge	*Carex atherodes* Spreng.	marsh and slough margins
Woolly Sedge	*Carex lanuginosa* Michx.	slough margins
Blunt Sedge	*Carex obtusata* Lilj.	dry to moist grasslands
Graceful Sedge	*Carex praegracilis* W. Boott	wet meadows, slough edges
Low Sedge	*Carex stenophylla* Wahl.	dry grasslands
White-scaled Sedge	*Carex xerantica* Bailey	in willow groves
Creeping Spike-rush	*Eleocharis palustris* (L.) R.& S.	shallow wetlands, mud flats
Tall Cotton-grass	*Eriophorum angustifolium* Honck.	bogs, marshes
Viscid Great Bulrush	*Scirpus acutus* Muhl.	lake edge, marshes
Three-square Bulrush	*Scirpus americanus* Pers.	marshes, often saline wetlands
Prairie Bulrush	*Scirpus paludosus* Nels.	saline sloughs and marshes
Great Bulrush	*Scirpus validus* Vahl.	sloughs and marshes
Duckweed Family: Lemnaceae		
Lesser Duckweed	*Lemna minor* L.	ponds, marshes
Rush Family: Juncaceae		
Baltic Rush	*Juncus balticus* Willd.	shores, sandhills
Toad Rush	*Juncus bufonius* L.	bog area (springs)
Lily Family: Liliaceae		
Pink-flowered Onion	*Allium stellatum* Fraser	native prairie

COMMON NAME	*SPECIES*	*HABITAT*
Prairie Onion	*Allium textile* Nels. & Macbr.	dry prairie
Asparagus	*Asparagus officinalis* L.	old gardens, introduced
Western Wood Lily	*Lilium philalelphicum* L.	prairie, moist areas, meadows
Star-flowered Solomon's-Seal	*Smilacina stellata* L.	moist areas, meadows, woods
Smooth Camas	*Zyadenus elegans* Pursh	moist areas, saline meadows
Iris Family: Iridaceae		
Blue-eyed Grass	*Sisyrinchium montanum* Greene	meadows, moist areas
Orchid Family: Orchidaceae		
Northern Green Orchid	*Habenaria hyperborea* (L.) R.Br.	dugout edge near lake
Willow Family: Salicaceae		
Balsam Poplar	*Populus balsamifera* L.	island, near lakeshor
Aspen	*Populus tremuloides* Michx.	depressions in dry prairie
White Willow	*Salix alba* L.	shelterbelts, introduced
Beaked Willow	*Salix bebbiana* Sarg.	slough and lake margins
Short-capsuled Willow	*Salix brachycarpa* Nutt.	wet areas, sand dunes
Sandbar Willow	*Salix exigua* Nutt.	lakeshore, creeks, sloughs
Basket Willow	*Salix petiolaris* J.E. Smith	near spring
Elm Family: Ulmaceae		
American Elm	*Ulmus americana* L.	shelterbelts, introduced
Nettle Family: Urticaceae		
Stinging Nettle	*Urtica dioica* L.	moist areas, in shrubs
Sandalwood Family: Santalaceae		
Bastard Toadflax	*Comandra umbellata* (L.) Nutt. var. *pallida* (DC) Jones	dry grasslands
	Comandra umbellata (L.) Nutt. var. *umbellata*	prairie grasslands
Buckwheat Family: Polygonaceae		
Yellow Umbrellaplant	*Eriogonum flavum* Nutt.	dry prairie, eroded hillsides
Swamp Persicaria	*Polygonum amphibium* L. var. *stipulaceum* (Coleman) Fern.	sloughs, lakeshore, mud flats
Doorweed	*Polygonum aviculare* L.	yards, roadsides, waste places
Water Smartweed	*Polygonum coccineum* Muhl. var. *pratincola* (Greene) Stanford	moist sandy soils
Pale Persicaria	*Polygonum lapathifolium* L.	lakeshore, slough margins
Rhubarb	*Rheum rhaponticum* L.	old farmsteads, introduced
Golden Dock	*Rumex maritimus* L.	low prairie, saline areas
Field Dock	*Rumex pseudonatronatus* Borbas	marsh, wet areas
Narrow-leaved Dock	*Rumex triangulivalvis* (Dans.) Rech.f.	moist, open ground
Goosefoot Family: Chenopodiaceae		
Scurfless Salt-brush	*Atriplex dioica* (Nutt.) Macbr.	saline flats, eroded clay slopes
Nuttall's Atriplex	*Atriplex nuttallii* S.Wats.	dry prairie, eroded soils
Orache	*Atriplex patula* L.	roadside, saline meadows

COMMON NAME	SPECIES	HABITAT
Russian Pigweed	*Axyris amaranthoides* L.	yards, fields, shelterbelts
Lamb's-Quarters	*Chenopodium album* L.	gardens, fields, roadsides
Narrow-leaved Goosefoot	*Chenopodium leptophyllum* Nutt.	hillsides, prairie (burned sites)
Oak-leaved Goosefoot	*Chenopodium salinum* Standl.	saline flats
Winterfat	*Eurotia lanata* (Pursh.) Moq.	dry prairie, heavy soils
Summer-cypress	*Kochia scoparia* (L.) Schrad.	farmyards, waste places
Red Samphire	*Salicornia rubra* A.Nels.	saline flats, slough margins
Russian-thistle	*Salsola kali* L.	roadsides, fields, waste places
Western Sea-blite	*Suaeda depressa* (Pursh) S.Wats.	saline flats
Amaranth Family: Amaranthaceae		
Red-root Pigweed	*Amaranthus retroflexus* L.	farmyards, waste areas
Purslane Family: Portulacaceae		
Purslane	*Portulaca oleracea* L.	gardens, introduced weed
Pink Family: Caryophyllaceae		
Field Chickweed	*Cerastium arvense* L.	prairie
Mouse-eared Chickweed	*Cerastium vulgatum* L.	pasture, woodlands, fields
Annual Baby's-breath	*Gypsophila elegans* Bieb.	picnic site, roads, escaped
Baby's-breath	*Gypsophila paniculata* L.	farmsite, roadsides, escaped
Cow Cockle	*Saponaria officinalis* L.	farmsteads, grainfields
Night-flowering Catchfly	*Silene noctiflora* L.	fields, introduced
Salt-marsh Sand Spurry	*Spergularia marina* (L.) Griseb.	saline shores
Fleshy Stitchwort	*Stellaria crassifolia* Ehrh.	bog area
Long-stalked Stitchwort	*Stellaria longipes* Goldie	moist areas, native prairie
Crowfoot Family: Ranunculaceae		
Canada Anemone	*Anemone canadensis* L.	low moist prairie, near bluffs
Long-fruited Anemone	*Anemone cylindrica* A. Gray	moist prairie
Crocus Anemone	*Anemone patens* L.	native prairie, heavily grazed
Tall Buttercup	*Ranunculus acris* L.	wetland ditches, moist areas
Large-leaved Watercrowfoot	*Ranunculus aquatilis* L.	dugout (not saline)
Seaside Buttercup	*Ranunculus cymbalaria* Pursh	saline areas, sloughs, banks
Shiny-leaved Buttercup	*Ranunculus glaberrimus* Hook	grazed pasture near stockpond
Macoun's Buttercup	*Ranunculus macounii* Britt.	along road, moist places
Prairie Buttercup	*Ranunculus rhomboideus* Goldie	ungrazed pasture, prairie
Veiny Meadow-rue	*Thalictrum venulosum* Trel.	woodlands, damp low prairie
Poppy Family: Papaveraceae		
Corn Poppy	*Papaver rhoeas* L.	farmstead, introduced
Fumitory Family: Fumariaceae		
Golden Corydalis	*Corydalis aurea* Willd.	moist areas, beaches
Caper Family: Capparidaceae		
Bee Plant/Spiderflower	*Cleome serrulata* Pursh	sandy soil, roadsides
Mustard Family: Cruciferae		
Purple Rock Cress	*Arabis divaricarpa* A. Nels.	native pasture
Hirsute Rock Cress	*Arabis hirsuta* (L.) Scop.	prairie, light loam
Reflexed Rockcress	*Arabis holboellii* Hornem. var. *retrofracta* (Graham) Rydb.	sandy native prairie

COMMON NAME	*SPECIES*	*HABITAT*
Shepherd's Purse	*Capsella bursa-pastoris* (L.) Medic.	gardens, waste places, fields, introduced
Gray Tansy Mustard	*Descurainia richardsonii* (Sweet) O.E. Schulz	fields, waste places
Flixweed	*Descurainia sophia* (L.) Webb.	disturbed areas, introduced
Yellow Whitlow-grass	*Draba nemorosa* L.	grazed pasture
Creeping Whitlow-grass	*Draba reptans* (Lam.)	sandy prairie
Dog mustard	*Erucastrum gallicum* (Willd.)O.E. Schulz	pasture, introduced
Small-flowered Prairie-rocket	*Erysimum inconspicuum* (S.Wats.) MacM.	dry, sandy prairie
Dame's-rocket	*Hesperis matronalis* L.	escaped, yards, hedges
Common Pepper-grass	*Lepidium densiflorum* Schrad.	yards, roadsides, fields
Sand Bladderpod	*Lesquerella arenosa* (Richards) Rydb. var. *arenosa* (Richards) Wats.	grazed pasture, dry native grassland
Marsh Yellow Cress	*Rorippa islandica* (Oeder) Borbas	lakeshore, slough edge, wet places
Tumbling Mustard	*Sisymbrium altissimum* L.	cultivated fields, gardens
Mouse-ear Cress	*Thellungiella salsuginea* (Pall.) O.E. Schulz	saline prairie
Stinkweed	*Thlaspi arvense* L.	fields, waste place
Saxifrage Family: Saxifragaceae		
Alumroot	*Heuchera richardsonii* R.Br.	native prairie, depressions
Northern Grass-of-Parnassus	*Parnassia palustris* L.	moist hummocky area
Wild Black Currant	*Ribes americanum* Mill.	bluffs, coulees, on islands
Golden Currant	*Ribes aureum* Pursh	sandy peninsula
Northern Gooseberry	*Ribes oxyacanthoides* L.	bluffs, coulees
Rose Family: Rosaceae		
Saskatoon	*Amelanchier alnifolia* Nutt.	coulees, bluffs
Hawthorn	*Crataegus chrysocarpa* Ashe	coulees, slopes, depressions
Smooth Wild Strawberry	*Fragaria virginiana* Dcne.	moist, shady areas
Three-flowered Avens	*Geum triflorum* Pursh	open prairie
Silverweed	*Potentilla anserina* L.	along streams, lakeshore
White Cinquefoil	*Potentilla arguta* Pursh	moist meadows, slough edges
Graceful Cinquefoil	*Potentilla gracilis* Dougl. var. *flabelliformis* (Lehm.) Nutt.	moist grassland, wet meadows
Wooly Cinquefoil	*Potentilla hippiana* Lehm.	dry native prairie
Rough Cinquefoil	*Potentilla norvegica* L.	meadows, waste areas, introd.
Bushy Cinquefoil	*Potentilla paradoxa* Nutt.	moist sandy beach
Prairie Cinquefoil	*Potentilla pensylvanica* L.	moist grasslands
Low Cinquefoil	*Potentilla plattensis* Nutt.	dry native prairie
Pin Cherry	*Prunus pensylvanica* L.F.	near bluffs, coulees
Chokecherry	*Prunus virginiana* L.	near bluffs, coulees
Low Prairie Rose	*Rosa arkansana* Porter	native prairie, sandy soils
Wood's Rose	*Rosa woodsii* Lindl.	bluffs, coulees on prairies
Narrow-leaved Meadowsweet	*Spiraea alba* Du Roi	depressions in native prairie
Legume Family: Leguminosae		
Purple Milk-vetch	*Astragalus agrestis* Dougl.	shade of willows in prairie
Two-grooved Milk-vetch	*Astragalus bisulcatus* (Hook.) Gray	sandy prairie, along beach
Canadian Milk-vetch	*Astragalus canadensis* L.	moist native prairie
Ground-plum	*Astragalus crassicarpus* Nutt.	native prairie

COMMON NAME	*SPECIES*	*HABITAT*
Slender Milk-vetch	*Astragalus flexuosus* Dougl.	native prairie along lakeshore
Missouri Milk-vetch	*Astragalus missouriensis* Nutt.	slopes, eroded hillside, prairie
Narrow-leaved Milk-vetch	*Astragalus pectinatus* Dougl.	native prairie
Racemose Milk-vetch	*Astragalus racemosus* Pursh	dry prairie slopes
Ascending Milk-vetch	*Astragalus striatus* Nutt.	dry grasslands, hillsides
Loose-flowered Milk-vetch	*Astragalus tenellus* Pursh	lakeshore, coulees
Common Caragana	*Caragana arborescens* Lam.	introduced, farmsteads
Wild Licorice	*Glycyrrhiza lepidota* (Nutt.) Pursh	near lake, slough margins
Alfalfa	*Medicago sativa* L.	hayfields, roadsides, introd.
White Sweet-clover	*Melilotus alba* Medic.	fields, ditches, introduced
Yellow Sweet-clover	*Melilotus officinalis* (L.) Pall.	fields, roadsides, introduced
Late Yellow Locoweed	*Oxytropis campestris* (L.) D.C.	dry prairie
Reflexed Locoweed	*Oxytropis deflexa* (Pall.) D.C.	old fields
Early Yellow Locoweed	*Oxytropis sericea* Nutt.	old fields near shelterbelt
Showy Locoweed	*Oxytropis splendens* Dougl.	native grasslands
White Prairie-clover	*Petalostemon candidum* (Willd.) Michx.	lakeshore, dry prairie
Purple Prairie-clover	*Petalostemon purpureum* (Vent.) Rydb.	prairie, hillsides, dry banks
Silverleaf Psoralea	*Psoralea argophylla* Pursh	native prairie
Golden-bean	*Thermopsis rhombifolia*(Nutt.)Richardson	prairie, roadsides, disturbed areas
Alsike Clover	*Trifolium hybridum* L.	farmsteads, roads, introduced
American Vetch	*Vicia americana* Muhl.	around bluffs, sandy beach
Tufted Vetch	*Vicia cracca* L.	roadside, introduced
Geranium Family: Geraniaceae		
Stork's-bill	*Erodium cicutarium* (L.) L'Her.	farmstead
Flax Family: Linaceae		
Lewis Wild Flax	*Linum lewsii* Pursh	dry prairie
Large-flowered Yellow Flax	*Linum rigidum* Pursh	sandy soils
Maple Family: Aceraceae		
Box-elder	*Acer negundo* L.	shelterbelts, streams, coulees
Mallow Family: Malvaceae		
Small-flowered Mallow	*Malva parviflora* L.	farmyards, fields, introduced
Round-leaved Mallow	*Malva pusilla* Sm.	old farmstead
Scarlet Mallow	*Sphaeralcea coccinea* (Pursh) Rydb.	dry prairie, disturbed areas
Violet Family: Violaceae		
Early Blue Violet	*Viola adunca* J.E. Smith	wet meadow, shady areas
Bog Violet	*Viola nephrophylla* Greene	moist meadows, sloughs
Nuttall's Yellow Violet	*Viola nuttallii* Pursh	open prairie
Crowfoot Violet	*Viola pedatifida* G. Don	prairie, damp sandy loam
Oleaster Family: Elaeagnaceae		
Silverberry	*Elaeagnus commutata* Bernh.	moist light soils
Buffaloberry	*Shepherdia argentea* Nutt.	lakeshore, coulees, light soils

COMMON NAME	*SPECIES*	*HABITAT*
Evening-Primrose Family: Onagraceae		
Fireweed	*Epilobium angustifolium* L.	moist places, island
Marsh Willowherb	*Epilobium palustre* L.	edge of spring pond
Scarlet Gaura	*Gaura coccinea* Pursh	dry native grasslands
Yellow Evening-primrose	*Oenothera biennis* L.	hay field
White Evening-primrose	*Oenothera nuttallii* Sweet	sandy soil, fields, roadsides
Water Milfoil Family: Haloragaceae		
Spiked Water-milfoil	*Myriophyllum exalbescens* Fern.	sloughs, lake
Mare's Tail Family: Hippuridaceae		
Mare's-tail	*Hippuris vuglaris* L.	sloughs, streams, banks
Parsley Family: Umbelliferae		
Water-Hemlock	*Cicuta maculata* L.	marshes, springs or bogs
Plains Cymopterus	*Cymopterus acaulis* (Pursh) Raf.	dry prairie, hillsides
Leafy Musineon	*Musineon divaricatum* (Pursh) Nutt.	prairie grasslands
Water-Parsnip	*Sium suave* Walt.	wetlands, sloughs, ponds
Heart-leaved Alexanders	*Zizia aptera* (Gray) Fern.	moist native prairie
Dogwood Family: Cornaceae		
Red-osier Dogwood	*Cornus stolonifera* Michx.	coulees
Primrose Family: Primulaceae		
Pygmyflower	*Androsace septentrionalis* L.	dry soils, fields
Saline Shootingstar	*Dodecatheon pulchellum* (Raf.) Merr.	moist to wet saline areas
Sea-Milkwort	*Glaux maritima* L.	moist saline areas
Fringed Loosestrife	*Lysimachia ciliata* L.	drying slough
Lance-leaved Loosestrife	*Lysimachia hybrida* Michx.	marsh
Mealy Primrose	*Primula incana* M.E. Jones	saline meadows, moist places
Olive Family: Oleaceae		
Common Lilac	*Syringa vulgaris* L.	shelterbelts, introduced
Gentian Family: Gentianaceae		
Oblong-leaved Gentian	*Gentiana affinis* Griseb.	prairie, saline moist meadow
Northern Gentian	*Gentiana amarella* L.	heavily grazed native prairie
Dogbane Family: Apocynaceae		
Indian-hemp	*Apocynum cannabinum* L. var. *hypericifolium* (Ait.) Gray	aspen bluffs, island
Phlox Family: Polemoniaceae		
Moss Phlox	*Phlox hoodii* Richardson	native prairie, dry sandy loam
Borage Family: Boraginaceae		
Large-flowered Stickseed	*Hackelia floribunda* (Lehm.) Johnst.	island, high ground
Bluebur	*Lappula echinata* Gilib.	fields, pastures, introduced
Bluebur	*Lappula occidentalis* (S. Wats.) Greene	old prairie trail
Narrow-leaved Pucoon	*Lithospermum incisum* Lehm.	dry prairie

COMMON NAME	*SPECIES*	*HABITAT*
Mint Family: Labiatae		
Hemp-nettle	*Galeopsis tetrahit* L.	dugout edge, introduced
Western Water-horehound	*Lycopus asper* Greene	springs, marshes
Field Mint	*Mentha arvensis* L.	sloughs, wet places
Marsh Skullcap	*Scutellaria galericulata* L.	wet places, slough edge
Marsh Hedge-nettle	*Stachys palustris* L. var. *pilosa* (Nutt.) Fern.	marshes, wetlands
Potato Family: Solanaceae		
Wild Tomato	*Solanum triflorum* Nutt.	farmyards, disturbed areas
Figwort Family: Scrophulariaceae		
Yellow Toad-flax	*Linaria vulgaris* Miller	moist, grasslands, introduced
Owl's-clover	*Orthocarpus luteus* Nutt.	dry prairie, saline sites
White Beardtongue	*Penstemon albidus* Nutt.	dry prairie
Lilac-flowered Beardtongue	*Penstemon gracilis* Nutt.	native grasslands
Smooth Blue Beardtongue	*Penstemon nitidus* Dougl.	roadside, dry hillsides
Slender Beardtongue	*Penstemon procerus* Dougl.	moist, slough & brush margins
Marsh Speedwell	*Veronica scutellata* L.	slough edges, marshes
Bladderwort Family: Lentibulariaceae		
Greater Bladderwort	*Utricularia vulgaris* L.	ponds, marshes
Broom-rape Family: Orobanchaceae		
Clustered Broom-rape	*Orobanche fasciculata* Nutt.	on roots of *Artemisia* spp.
Plantain Family: Plantaginaceae		
Saline Plantain	*Plantago eriopoda* Torr.	saline or alkaline, marsh edges
Common Plantain	*Plantago major* L.	roadsides, yards, lawns
Madder Family: Rubiaceae		
Northern Bedstraw	*Galium boreale* L.	moist sites - prairie, bluffs
Honeysuckle Family: Caprifoliaceae		
Western Snowberry	*Symphoricarpos occidentalis* Hook.	prairie, coulees, woodlands
Bluebell Family: Campanulaceae		
Harebell	*Campanula rotundifolia* L.	low meadows, island
Lobelia Family: Lobeliaceae		
Spiked Lobelia	*Lobelia spicata* Lam.	dry sandy soil
Composite Family: Compositae		
Yarrow	*Achillea millefolium* L. var. *lanulosa* (Nutt.) Piper	native grasslands
False Dandelion	*Agoseris glauca* (Rush) Ref.	moist prairie
Perennial Ragweed	*Ambrosia coronopifolia* T. & G.	roadsides, lakeshore
Low Everlasting	*Antennaria aprica* Greene	dry prairies
Small-leaved Everlasting	*Antennaria parvifolia* Nutt.	dry prairie, saline meadows
Leafy Arnica	*Arnica chamissonis* Less.	slough bottoms, moist areas
Biennial Wormwood	*Artemisia biennis* Willd.	slough margins, roadsides
Plains Wormwood	*Artemisia campestris* L.	dry native prairie
Pasture Sage	*Artemisia frigida* Willd.	prairie, overgrazed

COMMON NAME	SPECIES	HABITAT
Prairie Sage	*Artemisia ludoviciana* Nutt.	slough margins, moist prairie
Rush Aster	*Aster borealis* (T.& G.) Provancher	mineral fen
Many-flowered Aster	*Aster ericoides* L. ssp. *pansus* (Blake) A.G. Jones	prairie, roadsides
Western Willow Aster	*Aster hesperius* A. Gray	moist areas
Smooth Aster	*Aster laevis* L.	moist prairie around bluffs
Few-flowered Aster	*Aster pauciflorus* Nutt.	saline prairie (rare)
Nodding Thistle	*Carduus nutans* L.	disturbed areas, introduced
Canada Thistle	*Cirsium arvense* (L.) Scop.	disturbed sites, introduced
Flodman's Thistle	*Cirsium flodmanii* (Rydb.) Arthur	prairie
Wavy-leaved Thistle	*Cirsium undulatum* (Nutt.) Spreng	near lake, sandy soils
Scapose Hawk's-Beard	*Crepis runcinata* (James) T. & B.	moist prairie
Narrow-leaved Hawk's-Beard	*Crepis tectorum* L.	disturbed soil
Rough Fleabane	*Erigeron asper* Nutt.	native prairie, dry hillsides
Tufted Fleabane	*Erigeron caespitosus* Nutt.	dry prairies, roadsides
Canada Fleabane	*Erigeron canadensis* L.	old gardens, fields, dry soils
Smooth Fleabane	*Erigeron glabellus* Nutt.	native prairie
Hirsute Fleabane	*Erigeron lonchophyllus* Hook.	wet areas
Great-flowered Gaillardia	*Gaillardia aristata* Pursh	dry grasslands
Gumweed	*Grindelia squarrosa* (Pursh) Danal.	saline flats, lakeshore
Broomweed	*Gutierrezia sarothrae* (Pursh)Britt.& Rusby	arid, native prairie
Lance-leaved Pyrrocoma	*Haplopappus lanceolatus* (Hook.) T.& G.	dry native prairie, saline areas
Mountain Sneezeweed	*Helenium autumnale* L.	low meadows, slough edges
Sunflower	*Helianthus annuus* L.	roadsides
Beautiful Sunflower	*Helianthus laetiflorus* Pers.	roadsides
Tuberous-rooted Sunflower	*Helianthus nuttallii* T. & G.	moist prairie, slough margins
Hairy Golden-Aster	*Heterotheca villosa* (Pursh) Skinners	dry sandy prairie
Povertyweed	*Iva axillaris* Pursh	saline flats, fields
False Ragweed	*Iva xanthifolia* Nutt.	roadsides, vacant land
Blue Lettuce	*Lactuca pulchella* (Pursh) DG.	old fields, roadsides
Meadow Blazingstar	*Liatris ligulistylis* (A. Nels.) K. Schum.	moist meadows, slough margins
Dotted Blazingstar	*Liatris punctata* Hook.	dry prairie hillsides
Skeletonweed	*Lygodesmia juncea* (Pursh) D. Don	dry native prairie, sandy soils
Pineappleweed	*Matricaria matricarioides* (Less.)Porter	farmsteads, introduced
Prairie False Dandelion	*Microseris cuspidata* (Pursh) Schultz-Bip.	native prairie
Arrow-leaved Colt's-foot	*Petasites sagittatus* (Pursh) A. Gray	partial shade, slough margins
Long-headed Coneflower	*Ratibida columnifera* (Nutt.)Woot.&Standl.	old fields, roadsides, dry prairie
Silvery Groundsel	*Senecio canus* Hook.	dry prairie
Marsh Ragwort	*Senecio congestus* (R.Br.) DC.	moist prairie, slough margins
Entire-leaved Groundsel	*Senecio integerrimus* Nutt.	native prairie
Balsam Groundsel	*Senecio pauperculus* Michx.	moist prairie, sandy soils

COMMON NAME	*SPECIES*	*HABITAT*
Graceful Goldenrod	*Solidago canadensis* L. var. *gilvocanescens* Rydb.	native prairie
Low Goldenrod	*Solidago missouriensis* Nutt.	dry prairie
Velvety Goldenrod	*Solidago mollis* Bartl.	dry prairie, roadsides
Showy Goldenrod	*Solidago nemoralis* Ait.	sandy soils, prairie
Upland White Goldenrod	*Solidago ptarmicoides* (Nees) Boiv.	dry prairie (rare)
Stiff Goldenrod	*Solidago rigida* L.	dry prairie
Mountain Goldenrod	*Solidago spathulata* DG.	ditch sides, grasslands
Perennial Sow-thistle	*Sonchus arvensis* L.	roadsides, fields, moist soils
Red-seeded Dandelion	*Taraxacum laevigatum* (Willd.) DC.	waste places, introduced
Dandelion	*Taraxacum officinale* Weber	pasture, roadsides, lawns
Goat's-beard	*Tragopogon dubius* Scop.	roads, field edges, introduced

Western Wood Lily *A. Whyte*

THE BIRDS OF LAST MOUNTAIN LAKE AND STALWART NATIONAL WILDLIFE AREAS, SASKATCHEWAN

BRENDA DALE, 409-2318 Arlington Avenue, Saskatoon, Saskatchewan. S7J 3L3

Last Mountain Lake is renowned as a tremendous staging area for birds migrating along the Mississippi and Central Flyways. This lake hosts hundreds of thousands of geese, ducks, swans and cranes, and multitudes of the less conspicuous shorebirds. Birds of prey and songbirds migrate through this region in lesser numbers. This paper presents current information on the status of birds at the northern end of Last Mountain Lake, a history of birding expeditions, a summary of the best birdwatching areas and a breakdown of avian activity by season.

The birds

The seasonal list for Last Mountain Lake National Wildlife Area (NWA) and nearby Stalwart NWA is appended to this note. It differs slightly from the checklist released earlier this year due to the addition of a breeding species - the Merlin - and the upgrading in status of several species.[7] A total of 258 species has been recorded in the vicinity of the two areas (Fig. 1). Just over 200 species can be expected every year (Table 1). Of the species present annually 89 are water and marsh birds. Twelve of 15 accidental species and 9 of 41 occasional species are water-oriented birds.

Of the one hundred species which have bred in or near the area in recent years, five are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the Caspian Tern as rare, the Ferruginous Hawk, Burrowing Owl and Loggerhead Shrike as threatened and the Piping Plover as endangered. Four species, Yellow Rail, Great Blue Heron, Common Nighthawk and Greater Prairie-Chicken, nested in the past but are no longer found breeding in this area. The prairie-chicken has been extirpated - the most recent record is a specimen collected 25 October, 1940 by the Saskatchewan Museum of Natural History (SMNH). American Kestrel, Yellow Rail, Common Nighthawk, Least Flycatcher, Warbling Vireo and Lark Sparrow, all present throughout the summer, are thought to breed but the evidence of eggs or young is lacking.

The 1977 version of the Last Mountain Lake Checklist had 216 species of which 91 were breeding.[6] The increase of 42 species includes old records for six species. Clark's Grebe, formerly a race of the Western Grebe, is now a species.[3] Wayne Harris reported seeing Clark's Grebe among Western Grebes at Last Mountain Lake in 1986.[5] Ten species were added because the area covered by the new checklist includes Stalwart NWA, the lake south to Liberty, and the farmland and towns near the lake. Other additional species, breeding records and date extensions are a result of additional reports of observations. Eleven of the new species are considered accidental. For some species, such as the egrets, White-faced Ibis, Cinnamon Teal and Orchard Oriole, their addition to the list or upgrading in status reflects a real extension of their ranges.

Bird studies

Accurate information on the species and numbers of birds at Last Mountain Lake prior to 1960 is scarce. Visits by qualified

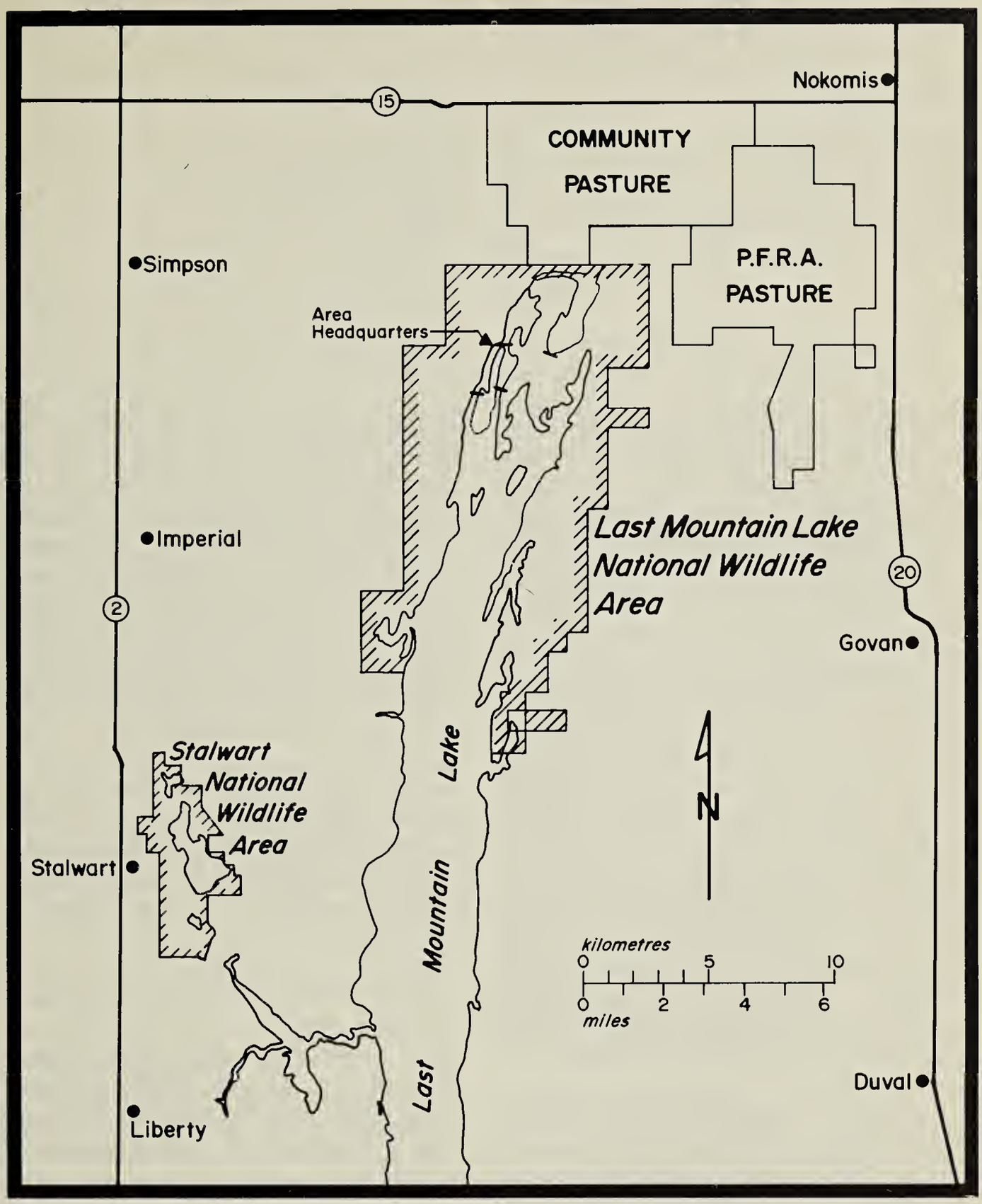


Figure 1. Last Mountain Lake - Stalwart area covered by C.W.S. bird checklist

observers were intermittent and usually brief; not all visitors kept records.

One of the first and most publicized visits was that of John Macoun and his Geological Survey of Canada party. They camped at the head of the lake during the first week of July 1879.[17] Unfortunately, Macoun rarely kept bird records in his daily diary and many specimens were poorly prepared and have not survived (W. Waiser, pers. comm.). One of the few remaining records is of a Red Phalarope (one of only four records for the province).[18]

H.Hedley Mitchell of SMNH spent some time studying the bird life of Last

Table 1. STATUS AND OCCURRENCE OF BIRD SPECIES AT LAST MOUNTAIN LAKE AND STALWART MARSH

Annual Species		*Irregular Species*	
Resident (Breeding)	8	Extirpated	1
Migrant (Breeding)	90	Migrant (Breeding)	2
Migrant	72	Migrant and Summer	32
Summer (Non-breeding)	19	Winter	7
Winter	12	Accidental	15
TOTAL	201		57

Mountain Lake, but his description of the avifauna of Saskatchewan is not very helpful in determining what he saw at specific places.[1] [19] The provincial museum has specimens of 120 species collected at the north end of Last Mountain Lake. Judging from specimen dates, collecting expeditions by the museum or affiliated collectors occurred in the 20s, 30s, 40s and 50s. There are also a few specimens from as early as 1913 and from the 60s to the present. Museum specimens provide the only records for the area of such species as the Turkey Vulture (5 October 1955), Yellow-bellied Flycatcher (27 May 1930), Alder (Traill's) Flycatcher (22 and 26 May 1930), and Rufous-sided Towhee (27 May 1924). There are also specimens of Oldsquaw, Parasitic Jaeger, Greater Prairie-Chicken, Western Wood-Pewee, Dickcissel and Smith's Longspur which have few other records for the lake.

Captain W.C. Huggins' monthly reports to J.B. Harkin in Ottawa for the period 1923 to 1931, usually noted the first and last dates of the obvious and more economically important bird species.[5] His reports were not always very specific (e.g."ducks going north)."

Reuben Lloyd and his son, Albert, of Davidson were active banders who ringed 246 Double-crested Cormorants at Last Mountain Lake in the period 1923-28.[14] Albert Lloyd and George M. Sutton were part of the 1932 Carnegie Museum collecting expedition led by W.E. Clyde Todd. They spent 22 May to 7 June and 12 to 20 June 1932 at the head of Last Mountain Lake. A total of 477 specimens of 83 species was collected. The summary of their sightings was published some years later.[22] This paper and the Carnegie Museum's Last Mountain Lake collection provide the first comprehensive coverage of the avifauna of Last Mountain Lake with 120 species seen or collected.

Fred Bard of the SMNH banded birds (mainly waterfowl, pelicans and cormorants) at Last Mountain Lake in 1934, 36-40, 48 and 49.[15] [16] C. Stuart Houston banded pelicans and cormorants in 1954.[13]

Brief visits by B.H. Segre (1913), R.M. Anderson (1917), P.A. Taverner and Hoyes Lloyd (1920), C.G. Harrold (1922 and 28), J.A. Munro (1927), J.Dewey Soper (1936 and 1947) and D.A. Munro (1947) resulted in some additional records.

Visits by Canadian Wildlife Service (CWS) personnel began in 1960 and thereafter the quantity of records increased. A study of Sandhill Cranes was conducted from 1961-63.[21] The first of two resident managers was assigned there in 1968. John Hatfield (1968-1973) and Clint Jorgenson (1973-) have recorded arrivals and departures of many migratory birds (mainly waterfowl and colonial

nesting species).[5] Stuart Houston began an annual banding program of Great Horned Owls and hawks in the area in 1966. Gary Anweiler spent the spring, summer and fall of 1969 studying the natural history of the area. He kept extensive notes with records for 186 bird species.[4] Ken Lumbis and Mike Gollop studied Sandhill Crane migration in and around the sanctuary in 1975 and 1976, respectively. They kept records of all other species seen.[5] Wayne Harris has organized and compiled Christmas Bird Counts at the north end of the lake for the last 14 years. His other visits to Last Mountain Lake throughout the year have provided records. The author studied grassland passerines at Last Mountain Lake in 1980-81 and kept a daily log of all species seen in the Wildlife Area (171 species).[9] Twelve visits to Stalwart NWA in 1983 resulted in records for 103 species.[10] Mark Colwell studied shorebirds (mainly Wilson's Phalarope) in spring and early summer from 1982-87.[8] A CWS study on the effects of fire on grassland vegetation and birds ran from 1982 to 1987.[11] CWS projects monitored fall waterfowl and crane numbers and feeding patterns from 1982 to 1986. Short visits by CWS personnel (principally J.B. Gollop, A.R. Smith and P.S. Taylor) and local and international birdwatchers have produced other records.

Where to find birds

The National Wildlife Areas are primarily places for wildlife. NWA regulations provide protection for wildlife and the habitat that sustains it. Many old trails are closed and access is restricted to foot traffic. Some areas are off-limits for portions of the year, for example the lure crops during fall migration and the vicinity of nesting colonies in spring and early summer. Within these limitations there are still many opportunities to observe birds and other wildlife in the NWAs. To locate points referred to in the text refer to Figure 2.

May, September and October are peak months for migrant waterbirds on the lake. Last Mountain Regional Park on the east side and Imperial or Etter's Beach (7 km south of NWA) on the west are good vantage points. Boat launching is permitted at the Regional Park and Etter's Beach but no one should approach the islands or Perry's Point where colonial nesting occurs.

The Auto Tape Tour beginning at the Information Centre provides opportunities to see almost every type of habitat ocurring at Last Mountain Lake. The road travels past five basins created by Ducks Unlimited dams at the northern extremities of the lake. These basins contain deep water, marsh, wet meadow and bare shoreline which provide food, shelter, and loafing sites for many migrant and breeding species. A Viewing Tower near the basin east of the Information Centre provides an excellent view of several of the basins. The Wetland Nature Trail starts and ends at the Picnic Area. Ducks Unlimited recently constructed two dykes in Basin A. These structures give greater control over the water level in the basin and provide extra shoreline for migrating shorebirds and loafing ducks. Interspersed with the basins are many types of grassland habitat which support upland game and shorebirds as well as songbirds. Because of the variety of grassy habitats it is possible, by moving from marsh into upland, to encounter Sharp-tailed, Le Conte's, Savannah, Baird's, Clay-colored and Vesper Sparrows. Grasshopper Sparrows also occur in a very few locales. A 2 km long Grassland Nature Trail is located on the tour road.

There are very few treed areas in these NWAs. Migrating passerines concentrate in the Regional Park, Picnic Area, shelterbelts and farmsteads.

Stalwart NWA, just east of Highway No.2, has about 1500 ha of marsh and

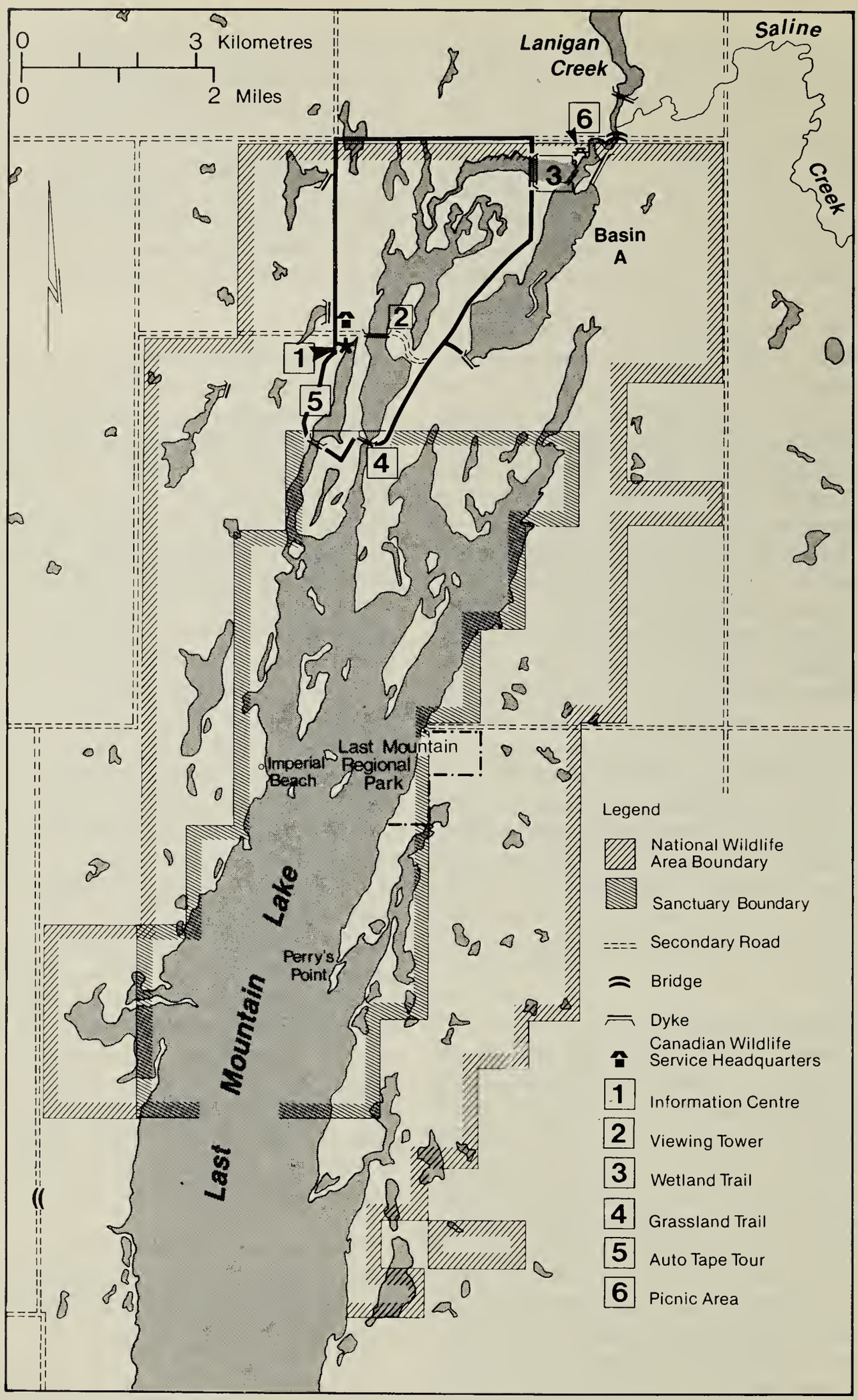
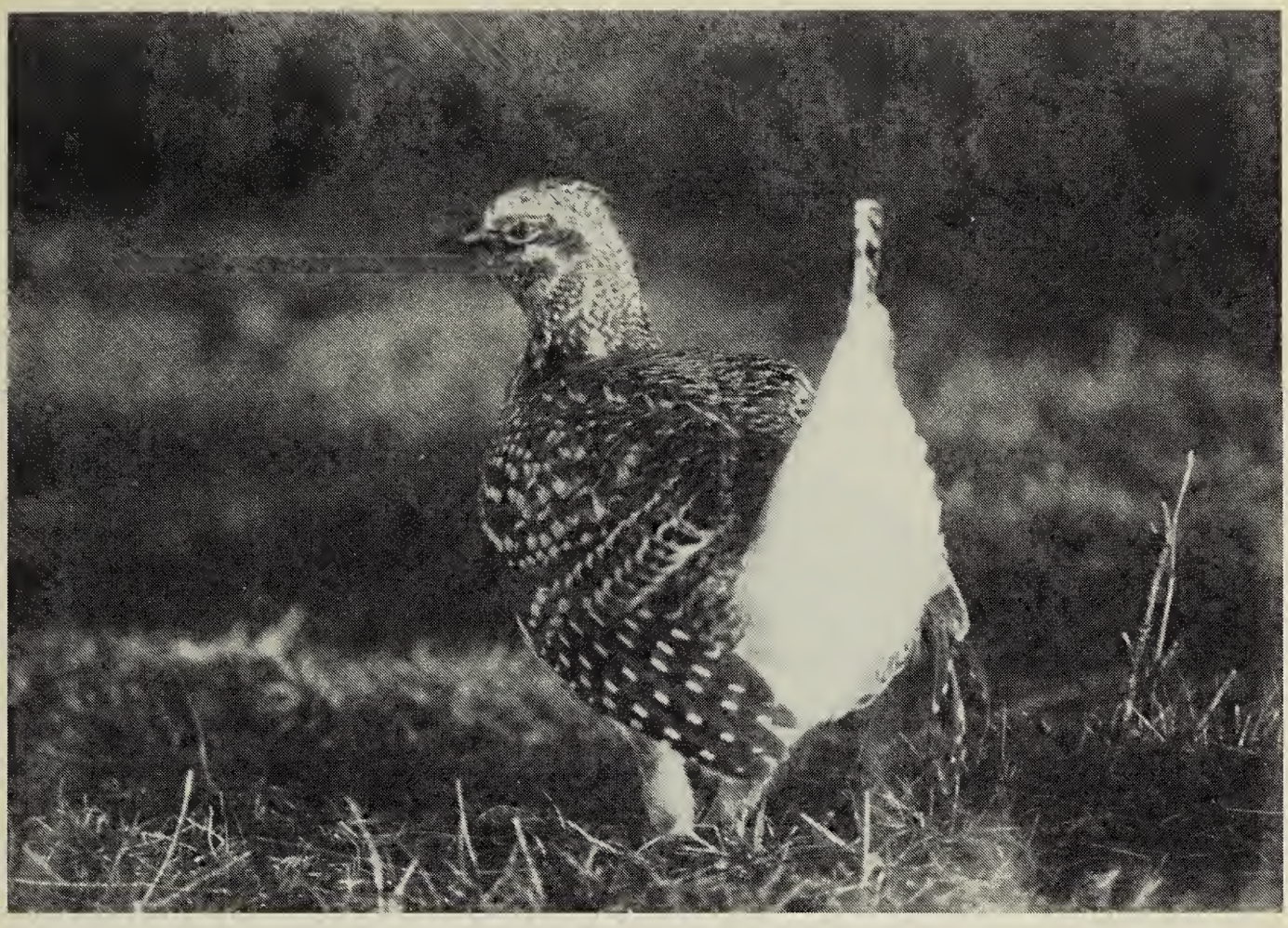


Figure 2. Points of interest Last Mountain Lake National Wildlife Area and Migratory Bird Sanctuary



Sharp-tailed Grouse *G.W. Beyersbergen*

associated uplands in sight of or within easy walking distance of grid roads. The marshes support breeding and migrating grebes, herons, waterfowl, rails, shorebirds and songbirds. Burrowing Owls have been found breeding in several places on and near the NWA.

The number of species that can be seen in the area fluctuates with the seasons. Table 2 gives the seasonal variation in numbers of species.

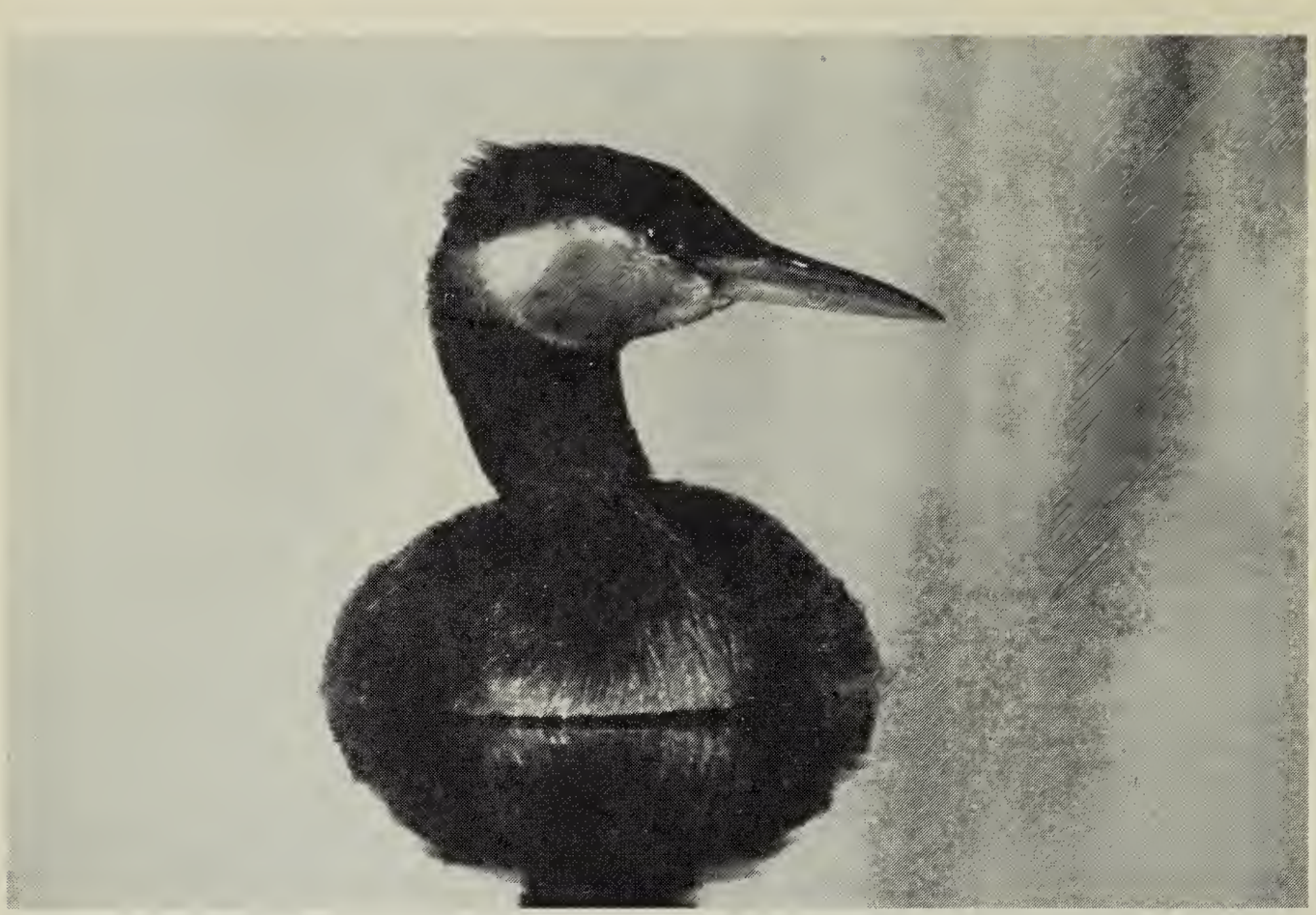
Spring (March through May)

Spring migration results in large concentrations of and a great diversity of birds. Great Horned Owls are attending nests by the end of March and Sharp-tailed Grouse begin their ritual courtship dancing (there are about 30 leks in the two areas). A few Snowy Owls usually linger on the lake ice until spring breakup. The first crows, meadowlarks and harriers arrive in March or early April. April and May bring at least 170 additional species to the north end of Last Mountain Lake. The 8 resident species and members of about 90 other species will breed while others of their kind fly farther north with the strictly migrant species.

Canada Geese and Mallards begin ar-

Table 2. SUMMARY OF SPECIES ABUNDANCE BY SEASON

Abundance	*Spring*	*Summer*	*Fall*	*Winter*
Abundant	8	2	11	0
Common	81	68	56	7
Uncommon	74	50	83	7
Rare	16	25	31	7
Occasional	30	27	24	8



Red-necked Grebe *G.W. Beyersbergen*

riving before the ice is gone from the lake or basins. Species and numbers increase until at least 23 species of waterfowl numbering in the hundreds of thousands arrive. Several hundred pairs of Canada Geese and members of 12 duck species remain to nest while the swans, most geese and a large number of ducks move farther north.

The break up of ice is followed by the arrival of many other water birds: Common Loon, grebes (6 species), pelicans, cormorants, herons, coots, rails, shorebirds, gulls and terns. Great, Snowy, and Cattle egrets and White-faced Ibis have been appearing in Saskatchewan and at Last Mountain Lake with greater frequency in the last decade. The Great Egret has become almost an annual visitor to the lake.

The breeding shorebirds (Piping Plover, Killdeer, American Avocet, Willet, Spotted Sandpiper, Upland Sandpiper, Marbled Godwit, Common Snipe and Wilson's Phalarope) arrive from mid-April through early May. The 21 species of migrant shorebirds begin arriving around the end of April and use a variety of habitats: pastures, marshes, mudflats, temporary wetlands and sandy or rocky shores.

Migrating Sandhill Cranes provide a spectacle worth seeing. Thousands of cranes pass through the area on their way north. During the peak migration, from mid-April through early May, sighting several thousand feeding and courting cranes in a stubble field is not unusual. The endangered Whooping Crane makes very few spring appearances at Last Mountain Lake.

Osprey, eagles, hawks and falcons remain in the area for varying lengths of time. Only Northern Harriers, Swainson's and Red-tailed Hawks are common. Among the less frequently observed raptors are the Cooper's Hawk and Peregrine Falcon considered rare and endangered,

respectively, by COSEWIC.

Flocks of Lapland Longspurs appear in the open fields early in April. Most passerines do not begin to arrive until May. Because of the scarcity of trees at Last Mountain Lake it is not on an important route for migrant flycatchers, vireos and warblers. The only regularly occurring spring flycatchers are the three that breed or are suspected to breed at the lake. There are spring records for just 14 warbler species, only 10 species occurring with any regularity. Most thrushes and sparrows can be observed in the area during migration.

Summer (June through August)

Summer is a relatively quiet season. During the heat of the summer birds are less numerous or obvious than during migration. In June breeding species are still singing and displaying; young grebes, waterfowl, shorebirds and grouse make their appearance. Many passerines are feeding young and by the end of June song begins to diminish in frequency. Female Wilson's Phalaropes complete their clutches and depart, leaving the males to hatch and raise the young. The last migrating shorebirds depart for the north about the time the yellowlegs and dowitchers begin to move south again. As fall approaches numbers reach impressive figures such as 15 thousand Red-necked Phalaropes reported in late August 1973. The colonial nesting species (Double-crested Cormorants, Ring-billed and California gulls, Common and the rare Caspian terns) raise their young on islands in the lake. The American White Pelican has recently been delisted by COSEWIC because of its improved continental breeding success. At Last Mountain Lake the pelicans' breeding record is still poor with only three successful breeding seasons (1972, 1984 and 1987) since 1954.[12] [20] Ducks congregate to moult. Sandhill Cranes begin arriving from the north early in August.

American White Pelican *G.W. Beyersbergen*

Fall (September through November)

This season is marked at Last Mountain Lake with spectacular concentrations of waterfowl and cranes, a great diversity of other migrants, plus the possibility of seeing rare and occasional species such as jaegers or endangered birds like the Peregrine Falcon or Whooping Crane. The timing of migration is largely determined by the severity of the weather. At the peak there will be hundreds of thousands of swans, geese, ducks and cranes (103 thousand geese 26 September 1984; 60 thousand Mallards 24 September 1986; 30 - 40 thousand Sandhill Cranes reported several times). Tremendous dawn and dusk flights take place accompanied by the all-pervasive voices of waterfowl and cranes. Some lure crops and grainfields will be blanketed with dark and white bodies; rafts of diving ducks will cover the deeper water of the basins or float on the main lake. Migrants swell the numbers of grebes and cormorants into the tens of thousands. As many as 16 species of raptors may pass southward but, as in the spring, only harriers and some buteos are common. Vireos, drab fall warblers and an assemblage of sparrows use the shelterbelts, farmsteads, and the trees and bushes bordering the lake. Grouse, partridge, pipits, sparrows and meadowlarks flush from grasslands and hayfields.

Winter (December through February)

This is a quiet season at Last Mountain Lake. The few resident species (Gray Partridge, Sharp-tailed Grouse, Rock Dove, Great Horned and Short-eared owls, Black-billed Magpie, European Starling and House Sparrow) are mainly concentrated in farmsteads. A few Northern Shrikes spend the winter months this far north, hunting from shelterbelts and farmsteads. Forest birds (woodpeckers, chickadees, grosbeaks and redpolls) appear in the farmsteads. Snowy Owls and Snow Buntings arrive from arctic Canada in the fall to winter in open fields. A few raptors such as Northern Goshawk, Rough-legged Hawk and Golden Eagle are seen rarely, hunting in the area.

Sandhill Cranes at Last Mountain Lake *S. Krasemann*

The end of the winter season is marked by the reappearance of the Horned Lark (a few may winter here) which begins to migrate early and may reach peak numbers before the end of February.

The Future

The Last Mountain Lake and Stalwart National Wildlife Areas, two islands of protected, diverse wetland and grassland habitat, will continue to attract large and diverse bird populations. With time observations will lead to some changes in status and seasonal occurrence and the addition of species to the list. Many of the species currently considered as occasional may use Last Mountain Lake on an annual basis in low numbers and go undetected because of the low intensity of birdwatching. Reports of bird observations (especially if they relate to the status or seasonal occurrence of a species) would be appreciated. They can be sent to the Area Manager or the Habitat Biologist at the Canadian Wildlife Service.

Acknowledgements

The Saskatchewan Museum of Natural History, the National Museum of Natural Sciences and the Carnegie Museum made records available. I am grateful to Keith Roney, Paul James, Henri Ouellet and Scott Wood of the aforementioned museums for their aid. I wish to thank the many individuals who shared their Last Mountain Lake bird records with the Canadian Wildlife Service. I thank Bernard Gollop and Philip Taylor for their comments.

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Tundra Swans *G.W. Beyersbergen*

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Male Ruddy Duck *G.W. Beyersbergen*

CHECKLIST OF THE BIRDS OF LAST MOUNTAIN LAKE AND STALWART MARSH NATIONAL WILDLIFE AREAS

The common names and sequence of species of this list are based on the 6th edition and 35th supplement of the American Ornithologists' Union "Check-list of North American birds."[2 3] Some common names will differ from those used in field guides published prior to 1983.

Terms and symbols in the checklist are as follows:

Seasons

Sp Spring . . . . . March-May
Su Summer . . . . . June-August
F Fall . . . . . September-November
W Winter . . . . . December-February

Breeding status - B

* - Indicates confirmed breeding
? - Present throughout summer but nest or young not seen

Abundance

A - Abundant: Seen on all visits to the preferred habitat within the proper season. Often occurs in large numbers.
C - Common: Seen on a majority of visits to the preferred habitat within the proper season. Numbers may vary considerably.
U - Uncommon: Seen on some visits to preferred habitat in the proper season. Present annually, but occurs in low numbers.
R - Rare: Expected every year, but in very low numbers at varying locations and may be difficult to find.
O - Occasional: Not expected every year.
Accidental: Last Mountain Lake is well outside its normal range. Not expected to occur again.
Extirpated: Species has been eliminated from this portion of its range.

Group	*Species*	*B*	*Sp*	*Su*	*F*	*W*
Loons						
	Pacific Loon		Accidental			
	Common Loon		U	R	U	-
Grebes						
	Pied-billed Grebe	*	C	C	C	-
	Horned Grebe	*	U	U	U	-
	Red-necked Grebe	*	U	U	U	-
	Eared Grebe	*	C	C	C	-
	Western Grebe	*	C	C	C	-
	Clark's Grebe	*	R	R	R	-
Pelicans and Cormorants						
	American White Pelican	*	C	C	C	-
	Double-crested Cormorant	*	C	C	A	-
Herons and Ibises						
	American Bittern	*	C	C	C	-
	Great Blue Heron		U	U	U	-
	Great Egret		O	O	-	-
	Snowy Egret		O	O	-	-
	Little Blue Heron		Accidental			
	Cattle Egret		O	O	-	-
	Black-crowned Night-Heron	*	C	C	C	-
	White-faced Ibis		O	O	-	-
Swans and Geese						
	Tundra Swan		C	O	C	-
	Trumpeter Swan		Accidental			
	Greater White-fronted Goose		A	-	A	-
	Snow Goose (includes Blue)		A	-	A	-
	Ross' Goose		U	-	U	-
	Brant		Accidental			
	Canada Goose	*	A	C	A	-
Ducks						
	Wood Duck		-	O	O	-
	Green-winged Teal	*	U	U	U	-
	American Black Duck		O	R	R	-
	Mallard	*	A	C	A	O
	Northern Pintail	*	C	C	C	-
	Blue-winged Teal	*	C	C	C	-
	Cinnamon Teal		R	O	O	-
	Northern Shoveler	*	C	C	C	-
	Gadwall	*	C	C	C	-
	American Wigeon	*	C	C	C	-
	Canvasback	*	C	U	C	-
	Redhead	*	C	U	C	-
	Ring-necked Duck		U	R	U	-
	Greater Scaup		O	-	-	-
	Lesser Scaup	*	A	C	A	-
	Oldsquaw		O	-	O	-
	Surf Scoter		Accidental			
	White-winged Scoter	*	U	U	U	-
	Common Goldeneye		U	O	U	-
	Barrow's Goldeneye		Accidental			
	Bufflehead		U	U	U	-
	Hooded Merganser		R	O	R	-
	Common Merganser		U	O	U	-
	Red-breasted Merganser		U	-	U	-
	Ruddy Duck	*	C	C	A	-
Hawks, Vultures and Allies						
	Turkey Vulture		Accidental			
	Osprey		R	O	R	-
	Bald Eagle		U	-	U	-

Group *Species*	*B*	*Sp*	*Su*	*F*	*W*
Northern Harrier	*	C	C	C	-
Sharp-shinned Hawk		U	-	U	-
Cooper's Hawk		U	-	U	-
Northern Goshawk		O	-	O	R
Swainson's Hawk	*	C	C	C	-
Red-tailed Hawk	*	C	R	C	-
Ferruginous Hawk	*	R	R	R	-
Rough-legged Hawk		U	-	U	R
Golden Eagle		R	-	R	R
Falcons					
American Kestrel	?	U	R	U	-
Merlin	*	U	R	U	-
Peregrine Falcon		R	O	R	-
Gyrfalcon		-	-	O	O
Prairie Falcon		O	-	R	-
Grouse					
Gray Partridge	*	C	C	C	C
Ring-necked Pheasant		O	O	O	O
Ruffed Grouse		O	O	O	O
Greater Prairie-Chicken		Extirpated			
Sharp-tailed Grouse	*	C	C	C	C
Rails and Coots					
Yellow Rail	?	U	U	R	-
Virginia Rail	*	U	U	-	-
Sora	*	C	C	C	-
American Coot	*	C	C	A	-
Cranes					
Sandhill Crane		A	U	A	-
Whooping Crane		O	-	R	-
Plovers					
Black-bellied Plover		C	O	C	-
Lesser Golden-Plover		C	R	R	-
Semipalmated Plover		U	U	U	-
Piping Plover	*	U	U	R	-
Killdeer	*	C	C	C	-
Avocets					
American Avocet	*	C	C	C	-
Sandpipers and Allies					
Greater Yellowlegs		U	C	C	-
Lesser Yellowlegs		C	C	C	-
Solitary Sandpiper		R	U	R	-
Willet	*	C	C	C	-
Spotted Sandpiper	*	U	U	U	-
Upland Sandpiper	*	U	U	-	-
Whimbrel		O	-	-	-
Long-billed Curlew		O	-	-	-
Hudsonian Godwit		U	U	U	-
Marbled Godwit	*	C	C	C	-
Ruddy Turnstone		U	U	-	-
Red Knot		C	U	O	-
Sanderling		C	U	U	-
Semipalmated Sandpiper		C	C	U	-
Least Sandpiper		C	C	U	-
White-rumped Sandpiper		U	U	-	-
Baird's Sandpiper		C	U	U	-
Pectoral Sandpiper		C	C	U	-
Purple Sandpiper		Accidental			
Dunlin		U	U	-	-
Stilt Sandpiper		C	C	U	-
Buff-breasted Sandpiper		R	-	-	-
Short-billed Dowitcher		U	U	R	-
Long-billed Dowitcher		C	C	U	-
Common Snipe	*	U	U	U	-
Wilson's Phalarope	*	C	C	-	-
Red-necked Phalarope		C	A	U	-
Red Phalarope		Accidental			
Jaegers					
Pomarine Jaeger		O	-	O	-
Parasitic Jaeger		-	-	O	-
Long-tailed Jaeger		Accidental			
Gulls					
Franklin's Gull	*	C	C	C	-
Bonaparte's Gull		U	U	U	-
Ring-billed Gull	*	A	A	A	-
California Gull	*	C	C	U	-
Herring Gull		U	O	U	-
Thayer's Gull		Accidental			
Glaucous Gull		Accidental			
Sabine's Gull		Accidental			
Terns					
Caspian Tern	*	U	U	-	-
Common Tern	*	C	C	R	-
Forster's Tern	*	U	U	-	-
Black Tern	*	C	C	U	-
Doves					
Rock Dove	*	C	C	C	C
Mourning Dove	*	C	C	U	-
Cuckoos					
Black-billed Cuckoo	*	-	U	R	-
Owls					
Great Horned Owl	*	U	U	U	U
Snowy Owl		U	-	U	U
Burrowing Owl	*	R	R	R	-
Long-eared Owl	*	U	U	U	-
Short-eared Owl	*	C	C	C	R
Nighthawks					
Common Nighthawk	?	U	U	U	-
Hummingbirds					
Ruby-throated Hummingbird		U	R	U	-
Kingfishers					
Belted Kingfisher		U	R	U	-
Woodpeckers					
Yellow-bellied Sapsucker		U	-	U	-
Downy Woodpecker		-	O	U	U
Hairy Woodpecker		-	O	U	U
Northern Flicker	*	C	C	C	-
Tyrant Flycatchers					
Olive-sided Flycatcher		-	-	O	-

Group	Species	B	Sp	Su	F	W
	Western Wood-Pewee		O	-	-	-
	Yellow-bellied Flycatcher		O	-	-	-
	Alder Flycatcher		O	-	-	-
	Least Flycatcher	?	U	U	-	-
	Eastern Phoebe		O	O	-	-
	Say's Phoebe		-	-	O	-
	Great Crested Flycatcher		-	-	O	-
	Western Kingbird	*	C	C	U	-
	Eastern Kingbird	*	C	C	U	-
Larks						
	Horned Lark	*	C	C	C	U
Swallows						
	Purple Martin	*	U	U	-	-
	Tree Swallow	*	C	C	U	-
	Northern Rough-winged Swallow		-	-	O	-
	Bank Swallow	*	U	U	U	-
	Cliff Swallow	*	U	U	-	-
	Barn Swallow	*	C	C	C	-
Jays, Crows and Magpies						
	Gray Jay		Accidental			
	Blue Jay		R	-	R	-
	Black-billed Magpie	*	C	C	C	C
	American Crow	*	C	C	C	-
	Common Raven		-	-	O	O
Chickadees						
	Black-capped Chickadee		U	-	U	U
Nuthatches						
	Red-breasted Nuthatch		R	-	R	-
Creepers						
	Brown Creeper		R	-	R	-
Wrens						
	Rock Wren		O	-	-	-
	House Wren	*	C	C	C	-
	Sedge Wren	*	U	U	-	-
	Marsh Wren	*	C	C	U	-
Kinglets						
	Golden-crowned Kinglet		U	-	U	-
	Ruby-crowned Kinglet		U	-	U	-
Thrushes						
	Mountain Bluebird		U	-	U	-
	Townsend's Solitaire		Accidental			
	Veery		U	O	-	-
	Gray-cheeked Thrush		U	-	U	-
	Swainson's Thrush		U	-	U	-
	Hermit Thrush		U	-	U	-
	American Robin	*	C	U	C	-
Mimic Thrushes						
	Gray Catbird	*	U	U	U	-
	Brown Thrasher	*	C	C	U	-
Pipits						
	Water Pipit		U	-	U	-
	Sprague's Pipit	*	C	C	C	-

Group	Species	B	Sp	Su	F	W
Waxwings						
	Bohemian Waxwing		U	-	U	R
	Cedar Waxwing	*	U	U	U	-
Shrikes						
	Northern Shrike		U	-	U	R
	Loggerhead Shrike	*	C	C	U	-
Starlings						
	European Starling	*	C	C	C	R
Vireos						
	Solitary Vireo		O	-	O	-
	Warbling Vireo	?	U	U	R	-
	Red-eyed Vireo		U	O	R	-
Wood-Warblers						
	Tennessee Warbler		U	R	U	-
	Orange-crowned Warbler		U	-	U	-
	Yellow Warbler	*	C	C	C	-
	Magnolia Warbler		O	-	O	-
	Cape May Warbler		-	-	R	-
	Yellow-rumped Warbler		C	-	C	-
	Palm Warbler		U	-	C	-
	Bay-breasted Warbler		O	-	-	-
	Blackpoll Warbler		U	-	U	-
	Black-and-white Warbler		R	-	R	-
	American Redstart		U	-	U	-
	Ovenbird		R	-	R	-
	Northern Waterthrush		O	-	O	-
	Connecticut Warbler		O	-	-	-
	Mourning Warbler		-	-	O	-
	Common Yellowthroat	*	U	U	U	-
	Wilson's Warbler		-	-	U	-
	Canada Warbler		-	-	R	-
Tanagers						
	Western Tanager		-	-	O	-
Grosbeaks and Allies						
	Rose-breasted Grosbeak		U	-	U	-
	Dickcissel		-	O	O	-
Sparrows and Allies						
	Rufous-sided Towhee		O	-	-	-
	American Tree Sparrow		C	-	C	-
	Chipping Sparrow		C	R	U	-
	Clay-colored Sparrow	*	C	C	C	-
	Vesper Sparrow	*	C	C	U	-
	Lark Sparrow	?	U	U	-	-
	Lark Bunting	*	O	O	-	-
	Savannah Sparrow	*	C	C	C	-
	Baird's Sparrow	*	C	C	R	-
	Grasshopper Sparrow	*	R	R	R	-
	Le Conte's Sparrow	*	C	C	R	-
	Sharp-tailed Sparrow	*	U	U	R	-
	Fox Sparrow		U	-	U	-
	Song Sparrow	*	U	U	U	-
	Lincoln's Sparrow		U	O	U	-
	Swamp Sparrow		U	-	U	-
	White-throated Sparrow		C	-	C	-
	White-crowned Sparrow		C	-	C	-

Group *Species*	*B*	*Sp*	*Su*	*F*	*W*
Harris' Sparrow		U	-	C	-
Dark-eyed Junco		C	-	C	-
McCown's Longspur		O	O	-	-
Lapland Longspur		A	-	A	-
Smith's Longspur		-	-	R	-
Chestnut-collared Longspur	*	C	C	C	-
Snow Bunting		U	-	C	C
Blackbirds and Orioles					
Bobolink	*	U	U	U	-
Red-winged Blackbird	*	C	C	C	-
Western Meadowlark	*	C	C	C	-
Yellow-headed Blackbird	*	C	C	C	-
Rusty Blackbird		U	-	U	-
Brewer's Blackbird	*	C	C	C	-
Common Grackle	*	U	U	U	-
Brown-headed Cowbird	*	C	C	U	-
Orchard Oriole	*	O	O	-	-
Northern Oriole	*	U	U	-	-
Finches and Allies					
Rosy Finch		-	-	-	O
Pine Grosbeak		-	-	O	O
Purple Finch		O	-	O	-
White-winged Crossbill		-	O	O	-
Common Redpoll		U	-	U	C
Hoary Redpoll		-	-	-	U
Pine Siskin		U	U	U	-
American Goldfinch	*	U	U	U	-
Evening Grosbeak		-	-	-	O
Old World Sparrows					
House Sparrow	*	C	C	C	C

Canada Goose *G.W. Beyersbergen*

SEASONAL SHOREBIRD ABUNDANCE AT LAST MOUNTAIN LAKE WILDLIFE MANAGEMENT UNIT

MARK A. COLWELL, Department of Biology, University of North Dakota, North Dakota. 58202

The prairie wetlands of Canada, exemplified by the Last Mountain Lake Sanctuary, provide important habitats for many species of birds. Approximately 20% of shorebird species that breed in North America use prairie wetland habitat; 65% of boreal and arctic-breeding species use these wetlands during migration.[5]

Several aspects of shorebird biology have focused conservation efforts on understanding resource requirements of migrating birds, particularly in marine environments.[5] First, migrating shorebirds typically use a limited number of staging areas that may be widely separated geographically. Second, seasonal availability of resources imposes time limits on migration resulting in concentrations of large numbers at sites with adequate food supplies. Third, many staging areas are also valuable to humans for a variety of reasons. Overall, much more is known of the abundance and habitat relationships of shorebirds in marine environments than of shorebirds that use freshwater habitats of the continental interior.[1 3 5 6]

Study area and methods

Data on shorebird abundance were collected during 1984, a year of extreme drought when approximately 90% of local wetlands were dry. Three sites at Last Mountain Lake Wildlife Management Unit were censused that differed in substrate, vegetation and open-water features. Censuses during 1983 indicated that these sites were representative of habitats that were used by nearly all breeding and migrating shorebirds in the area.

Shorebirds were observed from 30 April to 30 August at Lanigan Creek (S4-29-23-W2; 51° 27'N 105° 11'W), a 100 ha site composed of flooded meadow with Wild Barley (*Hordeum jubatum*), Seaside Arrowgrass (*Triglochin maritima*), sedges (*Carex* spp.) and rushes (*Juncus* spp.), and prairie with blue grasses (*Poa* spp.), Salt Grass (*Distichlis stricta*), wheatgrasses (*Agropyron* spp.), Western Snowberry (*Symphoricarpos occidentalis*) and Prickly Rose (*Rosa acicularis*) that bordered a permanent water source. During spring flooded meadow was extensive and mudflats constituted a small portion of available habitat. As summer progressed the meadow dried and mudflats became increasingly available.

Shorebirds were censused from 8 May to 28 August at a 10 ha site located on Basin A (S33-28-23-W2; 51° 26'N 105° 11'W). Shallow-water areas and adjoining mudflats under varying moisture conditions typified Basin A habitat. Bulrush stands (*Scirpus* spp.) dotted open-water habitat in spring; a dense growth of Red Samphire (*Salicornia rubra*) covered mudflats as water levels dropped. Otherwise the study area was unvegetated.

Shorebirds also were censused from 3 May to 20 August at Perry's Beach (W30-27-23-W2; 51° 18'N 105° 12'W), a 1.5 km stretch of sandy and rocky beach on the east shore of Last Mountain Lake. The beach varied in width from 5-30 m and was largely unvegetated. Lake water

levels changed very little during the study.

At Lanigan Creek and Basin A one to three observers censused shorebirds from 3-m towers using 20-25x spotting scopes and 7x binoculars. At Perry's Beach one observer walked the beach and recorded data from vantage points. Censuses at Lanigan Creek were conducted at random time intervals; each Basin A census was paired with a Lanigan Creek survey. Censuses at Perry's Beach were conducted at predetermined times.

The late April to August sampling period was divided into spring (April-June) and summer (July-August) based on the chronology of migration and breeding at Last Mountain Lake.[2] Total numbers of censuses at each site were as follows: Basin A spring 30, summer 23, Lanigan Creek spring 123, summer 99, Perry Beach spring 3, summer 19.

Results

Twenty-nine species of shorebirds were recorded during 1984 (includes two species of dowitchers not distinguished in Table 1). One other species, Buff-breasted Sandpiper also was observed during the study; it occurred on one occasion near the Perry's Beach study site during August. The total number of species recorded (regardless of season) was 25 at Basin A and 23 at each of Lanigan Creek and Perry's Beach. During any one season, however, the number of species ranged from 10 at Perry's Beach (spring) to 24 at Basin A (spring).

There was considerable variability in the seasonal abundance of species. The most abundant shorebirds during spring at Basin A were Stilt Sandpiper, Wilson's Phalarope and Semipalmated Sandpiper; the most common summer species were Semipalmated Sandpiper, dowitchers and Lesser Yellowlegs. Overall, 80% of species at Basin A were recorded during both spring and summer.

Wilson's Phalarope *G.W. Beyersbergen*

Table 1. SEASONAL SHOREBIRD ABUNDANCE AT THREE WETLAND SITES AT LAST MOUNTAIN LAKE

	Numbers Observed											
Site	Basin A				Lanigan Creek				Perry's Beach			
Season	Spring		Summer		Spring		Summer		Spring		Summer	
Species	*Total #*	$\bar{x}$	*Total #*	$\bar{x}$	*Total #*	$\bar{x}$	*Total #*	$\bar{x}$	*Total #*	$\bar{x}$	*Total #*	$\bar{x}$
Black-bellied Plover	6	0.2	2	0.1	-	-	-	-	-	-	8	0.4
Lesser Golden Plover	19	0.6	1	0.1	13	0.1	-	-	1	0.3	1	0.1
Semipalmated Plover	20	0.7	288	12.5	-	-	11	0.1	-	-	71	3.7
Piping Plover	1	0.1	-	-	-	-	-	-	-*	-	4	0.2
Killdeer	64*	2.1	44	1.9	291*	2.4	374	3.8	4*	1.3	157	8.3
American Avocet	395*	13.2	87	3.8	337*	2.7	45	0.5	3*	1.0	-	-
Greater Yellowlegs	7	0.2	14	0.6	12	0.1	149	1.5	-	-	82	4.3
Lesser Yellowlegs	364	12.1	972	42.3	65	0.5	1510	15.3	-	-	383	20.2
Solitary Sandpiper	-	-	2	0.1	-	-	-	-	-	-	1	0.1
Willet	65*	2.2	16	0.7	288*	2.3	86	0.9	10	3.3	122	6.4
Spotted Sandpiper	2	0.1	8	0.4	14*	0.1	38	0.4	-	-	35	1.8
Upland Sandpiper	1	0.1	-	-	73*	0.6	50	0.5	-	-	-	-
Hudsonian Godwit	8	0.3	24	1.0	2	0.1	21	0.2	2	0.7	248	13.1
Marbled Godwit	131*	4.4	104	4.5	258*	2.1	147	1.5	10	3.3	406	21.4
Ruddy Turnstone	-	-	-	-	-	-	-	-	-	-	4	0.2
Red Knot	-	-	-	-	1	0.1	-	-	103	34.3	24	1.3
Sanderling	10	0.3	-	-	6	0.1	-	-	122	40.7	130	6.8
Semipalmated Sandpiper	992	33.7	3056	132.9	99	0.8	385	3.9	2	0.7	51	2.7
Least Sandpiper	721	24.0	386	16.8	59	0.5	79	0.8	-	-	29	1.5
White-rumped Sandpiper	140	4.7	1	0.1	20	0.2	4	0.1	-	-	-	-
Baird's Sandpiper	13	0.1	40	0.4	13	0.1	40	0.4	-	-	116	6.1
Pectoral Sandpiper	23	0.8	19	0.8	15	0.1	81	0.8	-	-	24	1.3
Dunlin	27	0.9	-	-	-	-	-	-	-	-	-	-
Stilt Sandpiper	2231	74.4	567	24.7	438	3.6	146	1.5	-	-	2	0.1
Dowitcher sp.	859	28.6	1169	50.8	57	0.5	656	6.6	-	-	32	1.7
Common Snipe	-	-	-	-	26*	0.2	-	-	-	-	-	-
Wilson's Phalarope	1021*	34.0	319	13.9	1101*	9.0	1002	10.1	5	1.7	3	0.2
Red-necked Phalarope	497	16.6	81	3.5	84	0.7	145	1.5	-	-	-	-

[a] See text for number of censuses during a season, spring - April to June, summer - July, August; $\bar{x}$ = Average number seen on a census

* This species bred at the site or in close proximity to the wetland

Shorebird numbers at Lanigan Creek were much lower than at Basin A, despite the larger study area. The most common spring shorebirds were Wilson's Phalarope and Stilt Sandpiper; the most common summer species were Lesser Yellowlegs and Wilson's Phalarope. At Lanigan Creek 78% of species were observed during both seasons.

The spring shorebird assemblage at Perry's Beach was dominated by Red Knot and Sanderling. Lesser Yellowlegs, Hudsonian Godwit and Marbled Godwit were most abundant during summer. Overall 39% of species were present during spring and summer.

Shorebird abundance was not compared between sites owing to differences in the size and habitat configurations of the study areas. However, sites differed in species composition. During spring, Basin A shared 77% of the species with Lanigan Creek and only 38% with Perry's Beach. Lanigan Creek shared 45% of species with Perry's Beach. Species assemblages at the three sites were more similar during summer than spring. During summer Basin A had 82% and 72% of species in common with Lanigan Creek and Perry's Beach, respectively; Lanigan Creek and Perry's Beach shared 58% of species.

Discussion

Differences among sites in the abundance of shorebirds may be related to habitat features that reflect food or other resources. The presence of Semipalmated Plover at Basin A and its absence a short distance away at Lanigan Creek indicates that the availability of extensive mudflats may be an important habitat feature for this species. Similarly the nearly exclusive use of sandy and rocky lakeshore habitat by Red Knot and Sanderling suggests that these species have relatively strict habitat preferences. In contrast, species such as Lesser Yellowlegs, Marbled Godwit and some of the small peeps were found at all three sites.

Lanigan Creek *P.S. Taylor*

Apparent differences in shorebird assemblages may stem from the fact that fewer censuses were conducted at Perry's Beach, particularly during the spring. However species such as Red Knot, Sanderling and Ruddy Turnstone were largely responsible for the differences in species composition. These species were regularly observed at other lakeshore sites that were characterized by rocky and sandy beaches; they were rarely observed at Basin A and Lanigan Creek, despite extensive coverage of these sites.

Limited habitat availability stemming from drought conditions may have resulted in unusual patterns of habitat use during this study. In addition, shorebirds may have concentrated in larger numbers than usual at a limited number of sites. From a management perspective, however, drought conditions provide a situation offering special insights into habitat requirements of species. At such times limited habitat may force individuals to concentrate in areas where they may be subject to reduced food abundance, increased interference while foraging, and elevated risks of disease.[4]

In summary, Last Mountain Lake Wildlife Management Unit offers a diversity of habitats for more than 20 species of migrating shorebirds and 9 locally breeding species.

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Marbled Godwit *G.W. Beyersbergen*

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NOTE: Mark Colwell's studies at Last Mountain Lake were focused on the Wilson's Phalarope. Since this paper was developed from the data collected at three discrete sites in only one season the large concentrations of shorebirds that do occur at the lake were not reported here. As an example, there have been reports of 15 thousand Red-necked Phalaropes, 6 thousand Sanderlings and 5 thousand Ruddy Turnstones.

Semipalmated Plover *G.W. Beyersbergen*

MAMMALS AROUND THE NORTH END OF LAST MOUNTAIN LAKE

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The following list of 32 mammals is compiled from records of field work by Gary Anweiler in 1969, from the small mammal live trapping records of E.A. Driver, 1983-1986, and from personal observations made from 1973 to date.[1,4] The small mammal trapping by Driver confirmed the presence of several species. Records for 13 Christmas Mammal Counts (CMC) for the Last Mountain Lake area, compiled by W.C. Harris, are included (Table 1). The author's interpretation of the chances of sighting an individual species is given, however, this is very subjective and varies from year to year. Common names are taken from *The mammals of Canada* by A.W.F. Banfield.[2]

Masked Shrew

Anweiler listed this species as hypothetical with two summer sightings. Driver confirmed its occurrence by live trapping a specimen. This species is rarely seen.

Silver-haired Bat

Anweiler captured a single specimen on 9 May 1969. Bats are rarely seen.

Snowshoe Hare

Anweiler recorded a small colony in a farmstead shelterbelt and in June of 1969 found a nest with six young. Hare tracks were seen on 7 of the last 13 CMCs. One was recorded in an old area farmstead 17 March 1985. Hares are rarely seen in this area.

White-tailed Jack Rabbit

Jack rabbits were recorded on all 13 CMCs with numbers varying considerably. They are very commonly seen in all types of upland habitats.

Richardson's Ground Squirrel

During 1969 Anweiler found two small colonies of two or three pairs of Richardson's Ground Squirrel. Driver saw but did not trap the species. It is very common, especially in grazed pasture areas.

Richardson's Ground Squirrel *G.W. Beyersbergen*

Table 1. MAMMALS SEEN AT LAST MOUNTAIN LAKE ON CHRISTMAS MAMMAL COUNTS, 1973-1986.**

Species	15 Dec. 1973	28 Dec. 1974	28 Dec. 1975	1 Jan. 1976	29 Dec. 1977	27 Dec. 1979	24 Dec. 1980	29 Dec. 1981	26 Dec. 1982	2 Jan. 1983	2 Jan. 1984	2 Jan. 1985	27 Dec. 1986
Snowshoe Hare				.*	*	*	*		*	*			*
White-tailed Jack Rabbit	1	*	3	14	1	8	9	37	18	1	2	7	4
Beaver										L(1)			L(1)
Deer Mouse													1
Mouse (sp.)						*				*	*(7)		
Muskrat										L(40)	L(7)	*	L(18)
Meadow Vole		1											1
Porcupine	1	*(1)	1	1	1	*				*	3		2
Coyote		*(1)	*	*		*	*	1	*	2	1	2	3
Red Fox	1	*(1)	*	*				*(1)		*	*(1)	*(1)	2
Ermine													1
Long-tailed Weasel				*									
Weasel sp.			*		*	*		*	*(3)	*	*(1)	*	
American Mink	*	*(1)	*						*(1)				*
Badger				*						D(1)			D(2)
Striped Skunk			*										*(1)
White-tailed Deer	*	*(2)	*	3	2	*	2	4	*	*	22	3	7
Total Species	5	7	8	8	5	7	4	5	6	11	8	6	14

** from accounts published in *Blue Jay* compiled by W.C. Harris. No count made in 1978.

Legend: * = identified by tracks with estimated number of individuals in parentheses; D = fresh diggings seen; L = active lodges or huts seen.

Thirteen-lined Ground Squirrel

Anweiler did not see this species until late summer and early fall of 1969. Driver classed it as common to rare from 1983 to 1986. The author has seen this species on an annual basis since 1973 but the population has varied considerably. It is commonly sighted.

Franklin's Ground Squirrel

Anweiler had three sightings during 1969 and the author has had the occasional sighting since 1973, but the Franklin's Ground Squirrel is uncommonly seen.

Northern Pocket Gopher

Driver found fresh diggings in native prairie. The status of this species is uncertain but it is expected in moist, deep soils.

Olive-backed Pocket Mouse

Anweiler found a single pocket mouse dead on a cattle trail in May 1969. Nero gives the following records for this area: Hatfield, 7 mi. west, 17 September 1959 - 14 collected.[6] Last Mountain Lake, west of Govan, 26 September 1961 - one collected.[7] This mouse is rarely seen.

Beaver

Beaver were not mentioned by Anweiler but sightings occur most years and beaver lodges are not uncommon in deeper wetlands. One lodge was recorded on the 1983 and 1986 CMC.

Deer Mouse

The Deer Mouse is classed as a very common species by both Anweiler and Driver. It was recorded on one CMC.

Gapper's Red-backed Vole

This species was live trapped by Driver and listed as rare.

Muskrat

The Muskrat is very common in all marsh areas.

Meadow Vole

The Meadow Vole was listed as abundant by Anweiler in 1969 and Driver classed it as common to rare from his trapping records. It has been recorded on two CMCs and is a commonly seen mammal.

Norway Rat

Norway Rats are fairly common around

Muskrat *G.W. Beyersbergen*

many old, unkept buildings in the district.

House Mouse

A few House Mice were noted by Anweiler. They are occasionally seen in and around buildings.

Western Jumping Mouse

The Western Jumping Mouse was live trapped by Driver and listed as common to rare during his research 1983-1986.

Meadow Jumping Mouse

A jumping mouse seen by Anweiler in the garden at Canadian Wildlife Service Headquarters at the north end of Last Mountain Lake was possibly this species. It was classed by Anweiler as hypothetical and since there are no new records to add it remains hypothetical.

Porcupine

Anweiler saw Porcupine on at least six occasions, often in snowberry far out on the prairie. They were recorded on 9 of the 13 CMCs. The Porcupine is common and seen in all types of upland habitats.

Coyote

Anweiler recorded Coyotes on only two occasions in 1969 but it has been commonly seen and heard for the last few years. It was recorded on 11 of the 13 CMCs.

Red Fox

Anweiler listed the Red Fox as rarely seen but probably not uncommon. Foxes were recorded on 9 of the 13 CMCs with no observations for the years 1977 to 1980 inclusive. In recent years it has been a very common species for the area and often seen.

Raccoon

Raccoons were not seen or mentioned by Anweiler in 1969, but are now fairly common in this area although seldom seen. Tracks can be found around most wetlands.

Ermine

Anweiler saw this species on at least four occasions during the summer of 1969, noting that this species was a rather dark, chocolate-red color and that the Long-tailed Weasels were a golden brown. Weasel tracks have been recorded on 8 of the last 13 CMCs and may be attributed to this species. One was seen 27 December 1986. A species uncommonly seen.

Long-tailed Weasel

Anweiler saw this species on at least four occasions. One approached to within a few feet when he began "squeaking" on the back of his hand. Tracks of this species were seen on the 1 January 1976 CMC. Current status is uncertain; it is rarely seen.

Least Weasel

The Least Weasel was not recorded by Anweiler. It was live trapped by Driver on a study plot. Small weasels, either the Least Weasel or Ermine have been seen by the author on a number of occasions. Least Weasels are rarely seen.

American Mink

Anweiler listed mink as hypothetical. Tracks were seen on 5 of the last 13 CMCs. Mink are classed as fairly common although sighted only occasionally.

Red Fox kits *G.W. Beyersbergen*

American Badger

Anweiler listed the badger as hypothetical and probably an uncommon resident. Its presence has been recorded on 3 of the 13 CMCs. It has been a common resident with fairly regular sightings since 1973.

Striped Skunk

Skunks are very commonly seen from early spring until fall in all types of upland habitats. Tracks were seen 28 December 1975 (CMC) and 27 December 1986.

Lynx

John Hatfield reported to Anweiler the sighting of a Lynx crossing the prairie at the north end of Last Mountain Lake around 1967. From 1973 to the present, neither the mammal nor its tracks have been seen, thus this was a very rare transient.

Mule Deer

Anweiler and Hatfield saw a buck lying in a small ravine on 17 June 1969. There is a resident population of Mule Deer west of Highway #2 and the occasional transient visitor is sighted. Two were seen 7 July 1987.

White-tailed Deer

White-tailed Deer were recorded by Anweiler in 1969, and commonly seen by the author since 1973. The north end of Last Mountain Lake is an important wintering area. Wintering population counts have varied from a low of 32 on 10 April 1975, to a high of 134 on 9 February 1984. In February 1987, 109 Whitetail Deer were counted. They have been recorded on all 13 CMCs and are very common.

American Elk or **Wapiti**

A single young bull elk was seen periodically between 12 August and 10 October 1987 on and near the wildlife area by several observers. The species is not expected to occur again except as a wanderer.

Pronghorn

Pronghorn (Antelope) have been seen periodically for short periods of time in the area and can only be classified as transients. A single Pronghorn was seen on 16 June 1987 by Driver and the author. They are rarely seen here.

Conclusions

It is evident that the status of mammals at Last Mountain Lake continues to change. Several species of prairie mammals have become extirpated in the Last Mountain Lake district in the past 150 years, including the Plains Bison, the wolf and the grizzly bear, while others like the Red Fox and Raccoon have increased. One species, the Long-tailed Weasel, has been classified as "threatened" in Canada by the Committee on the Status of Endangered Wildlife in Canada. Its current status at Last Mountain Lake is uncertain. It is probable that additional species will be recorded in the area.

[1] ANWEILER, G. 1969. Records from field work at Last Mountain Lake, 1969. Unpublished field notes, Canadian Wildlife Service.

[2] BANFIELD, A.W.F. 1974. The mammals of Canada. Univ. of Toronto Press, Toronto.

[3] BURT, W.H. and R.P. GROSSENHEIDER 1976. A field guide to the mammals. Houghton Miffin Company, Boston.

[4] DRIVER, E.A. 1983-1986. Progress reports on prescribed burning research, Last Mountain Lake Wildlife Management Unit. Canadian Wildlife Service, Saskatoon, Saskatchewan.

[5] HATFIELD, J.P. 1965. Natural history notes - Last Mountain Lake Bird Sanctuary and vicinity. Queen's Printer, Ottawa.

[6] NERO, R.W. 1959. Some recent mammal records. *Blue Jay* 17:169.

[7] NERO, R.W. 1965. Recent pocket mouse records for Saskatchewan. *Blue Jay* 23:36-38.

NATURE LIBRARY

ALBERTA BIRD RECORD

A.O.R.C., 3426 Lane Crescent S.W., Calgary, Alberta. T3E 5X2 $10. per year.

Alberta Bird Record is a seasonal (quarterly) journal of field ornithology in Alberta. The province is divided into eleven reporting zones from which summaries are received for Winter (Dec. - Feb.), Spring (March - May), Summer (June - July) and Fall (Aug. - Nov.). Articles on migration trends, unusual behaviours, identification problems, current species' status, etc. are also published. Sample copies may be requested from ABR (c/o Federation of Alberta Naturalists) at the above address.

A WORLD OF WATCHERS

JOSEPH KASTNER. 1986. Alfred A. Knopf, New York. 241 pp. Bibliography, index. 19 black-and-white illustrations, 10 colour, from the work of Louis Agassiz Fuertes. Hardcover $36.75.

In *A Species of Eternity* (1977), Kastner gave a fine account of some 18th - and 19th-century naturalists who discovered and catalogued the New World's abundant natural riches. Now, in an equally handsome, gracefully-written and well-researched companion volume, he narrows his focus and expands his time frame to give, in the pertinent words of the cover blurb, "an informal history of the American passion for birds — from its scientific beginnings to the great birding boom of today."

The book opens with a nod to the Indians, who, despite their manifest perceptiveness, fail to qualify "in modern terms" as birders, according to Kastner, because they didn't keep lists. Perfunctory too is the author's treatment of such pre-1850 luminaries as Alexander Wilson, John James Audubon and Thomas Nuttall; they were given their due in the earlier book.

The first and perhaps most exciting of the three major periods of American birding, Kastner says, is the Bairdian Era, which began in the 1850s. Spencer Fullerton Baird was an orderly, reliable, highly conscientious man and from his youth a compulsive list-maker. From his office in the fledgling Smithsonian Institution, he organized scientific expeditions which, as adjuncts to military excursions, criss-crossed the Americas. Some of these parties were sent into the unexplored American West — where Indians were often less than hospitable — in order to map possible routes for a transcontinental railway. The soldiers were encouraged to study the natural history and collect specimens. The Army's medical corps, with its scientific background, was ideally suited to this pursuit. Several Army medics under Baird's direction became

bulwarks in American ornithology: Coues, Hammond, Xantus, Bendire are names familiar to anyone who has looked carefully at a modern bird guide.

Baird was thus able to incorporate the findings of his "missionaries" into a five-volume landmark work on ornithology of which he was senior author. The work refined the life-history approach to species accounts and set new standards of exactitude and conciseness in ornithological writing. Kastner credits Baird with having "organized the science of ornithology and, as a by-product, the disciplines of birding."

Another important organizer of the time was William Brewster, co-founder of the Nuttall Ornithological Club, which in 1876 began publishing the first periodical devoted wholly to birds. A contemporary, the aforementioned Elliott Coues, a man of prodigious accomplishment and prickly character, wrote a field guide which was one of a handful of works that "changed everything for American birders." Cumbersome as the guide seems today, it nonetheless made bird identification more efficient than it was before.

The second major period in the history of American birding is that of the Audubon Society with the great strides it made in popularizing bird watching and in spreading the gospel of bird protection. The first Society was formed in 1886. The first issue of Audubon magazine warned of the possibility of the extirpation of wild birds and, in another article, extolled the virtues of hawks, which were then generally regarded as vermin. Audubon societies were instrumental in the successful crusade against the fashion for adorning women's hats with bird plumes. They also recruited wardens to protect birds and, by appealing to the average rather than the expert birder, found support from a wide cross-section of the public — in contrast to the uppercrust, male-dominated organizations prevalent till about 1900.

The third period of U.S. birding history is that of the modern field guide, initiated in 1934 by the publication of Roger Tory Peterson's first book. The simplicity and ingenuity of the Peterson system helped make birds identifiable for millions of people who had never before been able to tell a cardinal from a catbird. And now, with improved optical equipment, commercially available bird-sound recordings, specialized publications, mountains of bird literature, and a community of thousands of dedicated birders across the continent, it is indeed true, as Kastner quotes author Christopher Leahy's statement that "a 'serious' birdwatcher today could easily instruct an 'ornithologist' of 150 years ago."

More important than birders' expertise is the fact that they now constitute "the largest, most insistent and often the most vociferous group of conservationists Constantly outdoors, disciplined to make specific and repeated observations and records, they are immediately sensitive to changes in the environment and through their network are able to confirm any wide harm that man may be doing to it."

Kastner relates his history with economy and grace. He sharply delineates the key characters, bringing them to life. His writing is rich in incident and anecdote, and his emphasis is always on people — what they saw, how they felt, how they banded together.

He tells of the House Sparrow controversy, the stories of the major bird clubs and publications, the role of women as educators and crusaders, the furor resulting from pressure to halt the "collecting" of specimens, Margaret Morse Nice and her celebrated Song Sparrow studies, and the tales of many individuals, some famous, some obscure, whose lives were touched in profound ways by birds.

Kastner offers many reasons why people watch birds and how they acquired "that

gentle obsession." He quotes conservationist Joseph Hickey, whose memorable definition of birding was "a mild paralysis of the central nervous system which can be cured only by rising at dawn and sitting in a bog." But what makes a good bird student? In the chapter on Nice, Kastner writes: "'A necessary condition for success,' she said, citing an English observer, 'is a continuous sympathetic observation of an animal under as natural conditions as possible. To some degree, one must transfer oneself into the animal's situation and' — here she gets about as close to the soul of birding as almost anyone can — 'inwardly take part in its behavior.'"

The Fuertes illustrations are striking, especially the ten watercolours, which are richly reproduced on glossy stock. Three line drawings, however, are incorrectly labelled in an index; indeed the book as a whole would have benefited from the services of a capable proofreader. But Watchers is a splendid example of quality bookmaking and it deserves a wide readership. How nice if it were to inspire a Canadian counterpart! For every Baird, Coues, Brewster and Bent active in the U.S., there was a Taverner, Macoun, Dionne and Seton working here, and their accomplishments are equally worthy of celebration. — Reviewed by *Bob Kohlmeier*, R.R. 5, G.B. 75, Saskatoon, Saskatchewan. S7K 3J8

Watching the 19000 swans at Goose Lake *Gary W. Seib*

SOCIETY NEWS

1987 AWARDS

The recipients of the society's awards for 1987 were Mary Houston, Doug Cole and Michael Monkman.

The Larry Morgotch Award was presented to Mary Houston for the series of slides which she showed at the Annual General Meeting in Moose Jaw.

Doug Cole, as General Manager of the Wakamow Valley Authority in Moose Jaw Doug handles finances, and supervises a staff of 3 permanent employees, 7 summer employees and 120 volunteers. He seems equally comfortable selling an idea to his board of directors or teaching preschoolers about wildlife. Because he holds to the philosophy that both natural and man made resources are valuable and should be both protected and used for education, Doug has promoted Project Wild, bringing 1500 students to Wakamow-sponsored education programs each year. He has developed a nature trail and cleaned up the river, leaving natural areas to coax wildlife into the city. On summer weekends he leads interpretive walks along the river. The SNHS recognises the outstanding contributions of Doug Cole to wildlife education and the conservation and interpretation of the natural heritage of the Moose Jaw River Valley, by presenting him with the 1987 Conservation Award.

Michael Monkman was not able to be present at the Annual Meeting and hence the Cliff Shaw Award was again presented via the mail. Michael's article in *Blue Jay* appeared in the December 1986 issue. It was entitled *Observations of an American Woodcock nest and egg dates in Manitoba*. The author reports detailed observations of the nesting of a woodcock. He is to be commended for being astute enough to notice that the female always faced away from the sun while incubating. Such small details of observation can be easily missed, yet may be of vast importance in some cases. May this report serve as an example to others to be exact and detailed in their observations.

FELLOWS OF THE SNHS

A motion was passed at the Annual Meeting creating a new class of membership. Up to five members may be named to this category in any one year to honour sustained contributions to the SNHS and its goals. Once selected, a Fellow holds that title as long as he/she remains a member of the society. Although our other awards do honour people who make major contributions to the society, a Fellowship acknowledges long-time contributors. The executive named four Fellows in 1987.

The names of our first two fellows seem

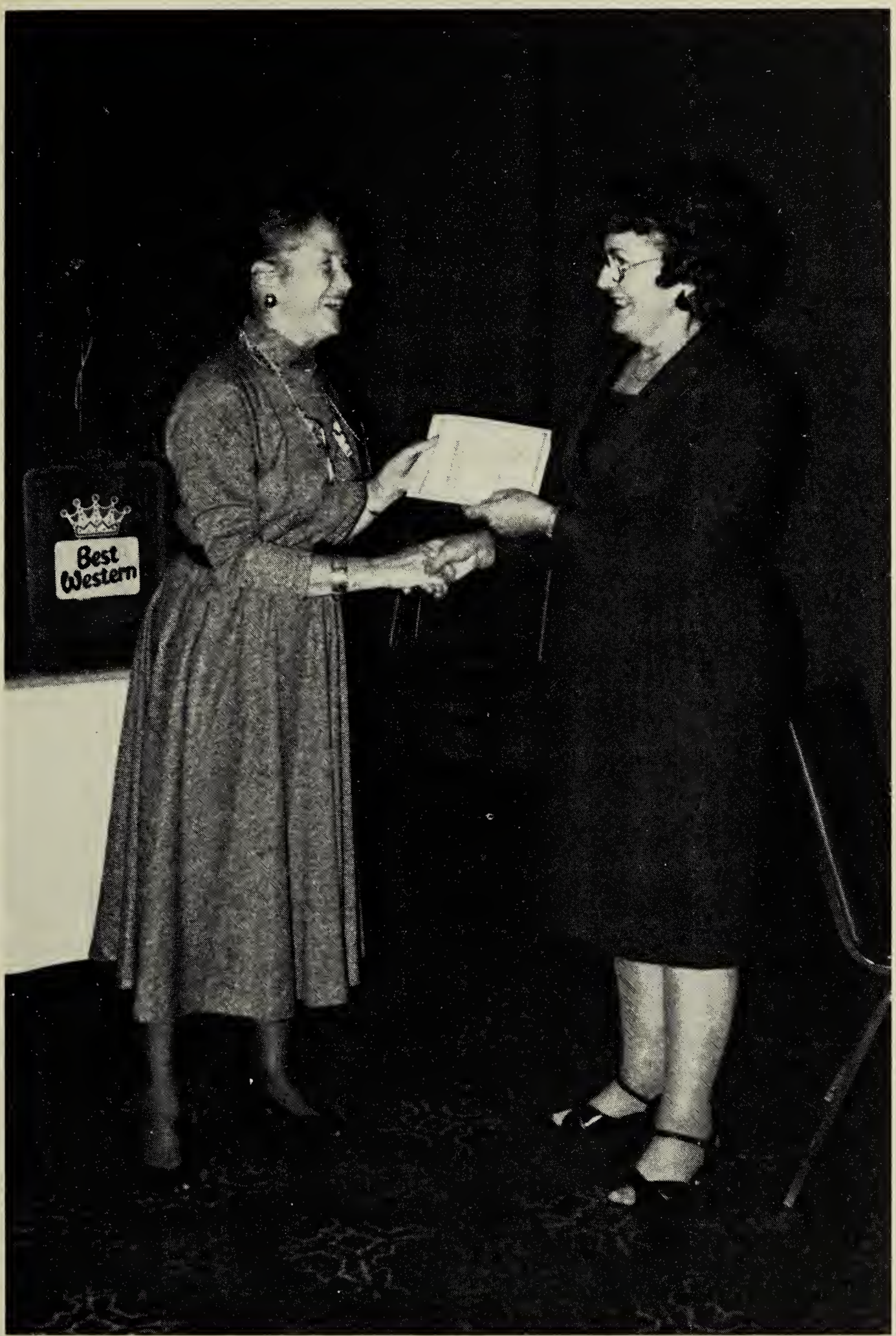
synonymous with the Saskatchewan Natural History Society. Stuart and Mary Houston have served this society in innumerable ways. Stuart's involvement goes back to the first issue of the Blue Jay. He is a past president and served many years editing our special publications. Mary served on the executive in a variety of positions and has compiled Christmas Bird Counts for the society since 1957. The Houston's banding expeditions have introduced many to ornithology and indeed, to the SNHS, and they are always ready with advice, encouragement and an extensive library. Mary and Stuart have authored numerous articles for the Blue Jay and are now heavily involved in producing the Manley Callin series of publications, especially the Birds of Saskatchewan.

Our third Fellow, Frank Brazier, has now resigned after 19 years as bookshop manager. He is to be commended for his unfailing appearance with boxes of books from the Blue Jay Bookshop for SNHS and local society meetings. Before taking on the Bookshop he served in posts such as president, treasurer and circulation manager. Frank is an active bird-watcher who turns up rarities and publishes in the Blue Jay.

The fourth member elected as a Fellow is Dr. George Ledingham. If anyone could claim the title of founder of the SNHS, it is George Ledingham. When the Yorkton Natural History Society ran into problems publishing The Blue Jay, George took the lead and organized the Saskatchewan Natural History Society. He has served as president and editor of The Blue Jay. George is a keen botanist and continues to work actively collecting specimens for the University of Regina Herbarium, and arranged the University's recent purchase of the Fort Qu'Appelle Herbarium. George has represented the Society at countless meetings and on numerous committees. He has worked continually through this society for establishment of the Grassland National Park and other ecological reserves.

Doug Cole (left), recipient of the 1987 Conservation Award, with Dale Hjertaas
F. Switzer

Lorne Scott (left), representing the Saskatchewan Wildlife Federation accepts $5000. from the SNHS for the Heritage Marsh Program *F. Switzer*



Mary Houston receiving the Larry Morgotch award for best slide presentation from Sheina Wait. *F. Switzer*

SASKATCHEWAN NATURAL HISTORY SOCIETY
Operating Statement for the year ended September 30, 1987

INCOME:				
Membership - regular		19,307.66		
Membership - Sustaining and Patron		2,845.00		22,154.66
Donations				960.00
Interest - received				6,489.83
Misc. income				25.00
Tour income				9,990.54
Sales Special Publication				2,180.23
Bookshop sales	37,013.33			
less cost of sales	(27,203.57)			
gross profit		9,809.76		
less costs: post etc	1,003.36			
less honor (40%)	3,522.56	(4,525.92)		
Net bookshop profit		5,283.84		
less transfer to habitat conser		5,000.00	283.84	
TOTAL INCOME				**42,084.10**
EXPENSES:				
Advertising and Promotion - ST grant		1,000.00		
expenditures		1,417.68	417.68	
Audit costs - ST grant		500.00		
expenditures		500.00	0.00	
Conservation Activities-Heritage Marsh		5,000.00		
- donation to N.D. Wildlife Soc.		200.00		
- transfer Heritage Marsh Trust		3,000.00		
- transfer Habitat Conservation		4,000.00		
- transfer Rare & Endangered spp.		3,000.00	15,200.00	
Bank charges			19.65	
Computer expense - ST grant		500.00		
- transfer purchase reserve		3,000.00		
- other expenses		789.00	3,289.00	
Honoraria - Blue Jay Editor			1,050.00	
Meeting - annual (profit)			(59.07)	
Meetings - board & other			264.81	
Memberships			180.00	
Misc. Office & Admin.			565.63	
Office equipment			39.20	
Office Supplies & Stationary			1,929.71	
Postage & Express - general			2,029.89	
Blue Jay - printing - cost	13,950.62			
Env't Can. grant	450.00	13,500.62		
- postage		363.88	13,864.50	
Blue Jay News - ST grant		4,000.00		
- cost of printing		2,269.44		
- postage		2,804.78	1,074.22	
Telephone			1,804.34	
Travel - ST grant		4,000.00		
- travel costs		3,215.19	(784.81)	
Wages - ST Grant		12,900.00		
- wages paid		12,331.04	(568.96)	
Employment expense			1,006.96	
TOTAL EXPENSES				**41,322.75**
	NET INCOME (gain)			**$ 761.35**

SASKATCHEWAN NATURAL HISTORY SOCIETY

Balance Sheet for the year ended September 30, 1987

ASSETS:				
Cash on hand (bookshop)			$ 40.00	
Bank - Current			22,578.04	
- Current (bookshop)			6,475.92	
- Savings			1,210.34	
- Savings (bookshop)			1.08	30,305.75
Investments - Regular Term			81,467.71	
- Life Membership-begin		19,449.01		
- new memberships & interest		2,996.04	22,445.05	
- Manley Callin bequest-begin		118,603.72		
-interest received		11,816.04	130,419.76	152,864.81
Accounts Receivable			430.00	
Equipment and Fixtures			7.00	
Stock on hand (bookshop)			8,038.60	
Customer accounts receivable		1,324.60		
less customer prepaid		4.50	1,320.10	
Supplier prepaid accounts			201.03	
TOTAL ASSETS				**$274,634.63**
LIABILITIES:				
Accounts payable			3,431.00	
Prepaid from ST			17,500.00	
Accounts payable (bookshop)			54.25	
Education tax payable			117.35	
Honorarium payable (bookshop)			3,832.99	24,935.59
TRUST ACCOUNTS				
Habitat Conservation -opening bal.	21,372.78			
less projects - Sage Grouse	1,000.00			
- Insecticide study	2,000.00			
- Screech Owl	300.00			
- Loggerhead Shrike	3,000.00			
- Piping Plover	1,400.00			
- Grassland Insects	891.49			
- Rafferty	2,000.00			
- Purchase pins, prints, etc.	1,284.40			
plus transfer from income	4,000.00			
- Bookshop profits	5,000.00			
- Member donations	3,710.65	22,207.54		
Heritage Marsh - opening balance	694.88			
plus donations	777.00			
transfer from income	3,000.00	4,471.88		
NCC Ecological Reserve		1,050.00		
Reserve computer purchase - begin	1,706.50			
transfer from income	3,000.00	4,706.50		
Reserve Special Publications	4,775.00			
CWS PWIC Webb Trust - beginning	2,628.43			
plus income book sales	105.06	2,733.49		
Life Membership Trust Fund		22,445.05		
Manley Callin Bequest Trust		130,419.76	$192,809.22	
PROJECTS				
IBP Research		113.77		
Endangered Species Research - begin	3,901.29			
plus member donations	200.00			
plus ST Grant	11,100.00			
plus WWF grant	10,780.00			
plus Wild. Hab. Can. grant	14,000.00			
contributions from income	3,000.00			
transfer wildlife centenial	2,000.00			
employment grant	630.00			
less Burrowing Owl project	27,544.95			
less Ferruginous Hawk	1,578.15			
less Trumpeter Swan	1,600.00			
less Herptiles Survey	2,725.68			
less Piping Plover	203.68	11,958.83		
Yorkton Project - opening balance	2,728.59			
less expenses	2,738.92	(10.33)		
Interpretive Programs - begin	3,221.26			
plus ST Grant	4,000.00			
less costs	6,537.46	683.80		
Critical Wildlife - begin	4,000.00			
plus WWF grant	4,320.00			
less expenses	5,042.69	3,277.31		
Floral Protection - begin	1,100.00			
less expenses	1,100.00	0.00		
Natural History Classes - begin	261.15			
plus ST Grant	400.00	661.15		
Wildlife Centennial Proj. - ST grant	2,200.00			
transfer to End. Sp.	2,000.00			
loss from Ramsar trip	144.17	55.83	$16,740.36	
NET WORTH:				
Opening balance		39,388.11		
plus net gain		761.35	40,149.46	
TOTAL LIABILITIES, TRUST FUNDS & NET WORTH			**$274,634.63**	

Fellows of the Saskatchewan Natural History Society, above (l. to r.) Stuart Houston, Mary Houston, Frank Brazier and below, George Ledingham *F. Switzer*

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